BULLETIN

OF

THE JOHNS HOPKINS HOSPITAL

Entered as Second-Class Matter at the Baltimore, Maryland, Postoffice.

Vol. XXIII.—No. 256.] BALTIMORE, JUNE, 1912. [Price, 25 Cents

CONTENTS.

	PAGE
Intestinal Obstruction: A Study of the Toxic Factors. (Illustrated.) By Harvey B. Stone, M. D., Bertram M. Bernheim, M. D., and George H. Whipple, M. D.	159
Primary Carcinoma of the Liver. By M. C. Winternitz, M. D.	165
A Method of Correlated Teaching of Pathology and Bacteriology in the Second Year of Medical Instruction. By Frederick P. Gay, M. D.	170
Richard Bright's Travels in Lower Hungary: A Physician's Holliday. (Illustrated.) By Fielding H. Garrison, M. D.	173
Austin Flint: His Contributions to the Art of Physical Diagnosis and the Study of Tuberculosis. By H. R. M. Landis, M. D.	182
Cyrano De Bergerac's Opinion of the Medical Profession. By Charles Greene Cumston, M. D.	186
Notes and News: Army Medical Corps Examinations.	189
Notes on New Books	190

INTESTINAL OBSTRUCTION: A STUDY OF THE TOXIC FACTORS.

By Harvey B. Stone, M. D., Bertram M. Bernheim, M. D., and George H. Whipple, M. D.

(From the Hunterian Laboratory, Johns Hopkins Medical School, Baltimore.)

No introduction to this work is more natural than a narrative of the manner in which we became interested in it. In the spring of 1911, two of us were doing some operations for the late Dr. A. H. Koelker,[1] who desired some pure pancreatic juice and duodenal secretion for the study of synthetic peptids. In order to obtain the duodenal secretion free from other digestive juices, we isolated the lower portion of the duodenum, from a point just distal to the lower pancreatic duct to the beginning of the jejunum, and reëstablished the alimentary canal by anastomosis of the stump of the duodenum to the upper jejunum. Believing that a delayed opening of the isolated loop would involve less risk of soiling the wound and the abdominal cavity, this loop was pulled up into the incision, which was closed about it, and the drainage of the closed loop postponed with the intention of doing it a day or two later. To our disappointment, however, all of these dogs, three in number, died within the first twenty-four hours, before drainage was established. At the first occurrence of this phenomenon we were inclined to attribute the outcome to some surgical error. When careful autopsies on all the cases failed to reveal any apparent cause for the result, other than the lack of drainage of the closed loop, we decided to try the same operation with the addition of an immediate enterostomy into the isolated portion of the duodenum. We succeeded in this way in providing Dr. Koelker with a dog from which he obtained the desired duodenal secretion. This dog was used by Dr. Koelker for several months in Baltimore, and was taken by him to New York and is perhaps still living. In considering the facts just related we were struck at once with the relation they bore to the problem of the cause of death in intestinal obstruction, and we felt that they suggested a method by which some of the problems connected with this great question might be solved. It is the result of this work, still incomplete but sufficiently advanced to justify this report, with which we are now to deal.

Intestinal obstruction from its great clinical importance and interesting physiological aspects, has of course been the subject of much experimental work and there has developed about it an extensive literature. At this time we shall attempt no exhaustive review of the latter, contenting ourselves with a summary of the more recent work. Three classical explanations have been given of the cause of death in obstruction; first, infection; second, nervous reflexes; third, intoxication.

[1] Koelker, A. H.: Ztschr. f. physiol. Chem., 1911, LXXVI, 27.

The third explanation is capable of subdivision into two groups of ideas as to the source of the toxic material. One of these attributes the noxious substance or substances to the activities of bacteria within the alimentary canal. The other theory postulates a secretion of the poisons by the glandular structures of the digestive tract. To these views must now be added a fourth, championed especially by Murphy and Vincent,[2] who in a recent publication say, "Interference with the circulation of the obstructed intestine is a vital factor in the production of the symptoms of ileus," and venous obstruction is the most important element in this circulatory interference. Before reporting the details of our own work, and discussing its bearing on these theories, the important facts already established that relate to the general problem will be reviewed briefly.

In a paper appearing quite recently, and directed along much the same lines as our present work, Hartwell and Hoguet[3] have shown by bacteriologic examinations on dogs with high intestinal obstructions that death may result without demonstrable invasion by organisms of the blood stream, peritoneum, liver or spleen. This and other work practically rule out the infection theory. There is no direct evidence to support the nervous reflex hypothesis and there is good experimental evidence against it. As to the origin of the supposed toxins—bacterial or secretory—certain observations generally accepted furnish collateral evidence of some importance. Thus J. W. Draper,[4] formerly known as J. W. D. Maury,[5] showed conclusively, in a long series of experiments, that obstructions high in the intestinal tract are much more quickly fatal than those situated lower down. This is in accordance with general clinical and experimental experience. It is also a well established fact that the bacterial flora of the alimentary tract is relatively poor about the duodenum and upper jejunum, and grows much more luxuriantly as one precedes aborally. These two facts taken in conjunction have led Roger[6] and others to feel that the bacterial explanation of the source of toxic substances is fallacious, since the part of the intestine poorest in bacterial inhabitants is that which yields the most rapidly fatal result when obstructed. As opposed to the position of Roger, Murphy and Vincent believe that the toxic substances are purely bacterial in origin, basing their opinion on observations they made as to the behavior of these substances. We feel that the conclusions reached by these authors are drawn from insufficient premises, and certain of our results do not agree with the observations reported by them. Further the importance attached by Murphy and Vincent to circulatory disturbance is not borne out by certain of our experiments, nor by closely similar experiments performed by Hartwell and Hoguet. These writers were able to produce typical obstructive symptoms without the element of circulatory interference, and the same findings were observed in the experiments now to be detailed.

[2] Murphy and Vincent: Boston M. & S. J., 1911, CXLV, 684.
[3] Hartwell and Hoguet: Am. J. M. Sc., 1912, CXLIII, 357.
[4] Draper, J. W.: J. Am. M. Ass., 1911, LVII, 1338.
[5] Maury, J. W. D.: Idem, 1909, CXXXVII, 725.
[6] Roger: Presse méd., 1911, I, 1.

Our first experiment has already been referred to. Four dogs were operated upon as follows—ether as in all these experiments being the anæsthetic. The duodenum just below the distal pancreatic duct was divided, the ends being closed and inverted. The gut was again divided in a similar manner at the beginning of the jejunum. An isolated loop from twelve to fifteen centimeters long was thus formed. The gastro-intestinal canal was then reëstablished, either by an end to end or lateral duodeno-jejunostomy, or by a posterior gastro-enterostomy and the abdomen closed.

As an example of this group the following protocol will serve.

Operation October 23, 1911, 3 p. m. Isolated loop of duodenum 15 centimeters long. Posterior gastro-enterostomy. Closure.

October 24, 11 a. m. Dog is dull. Tremors and staggering in hind legs. 2 p. m. much more drowsy, marked muscular tremors all over. Staggers badly when trying to walk. Pulse weak and rapid. 4 p. m. died with increasing general weakness and tremors.

All these dogs died within 28 hours. The post-operative course was fairly characteristic. With the exception of one or two attacks of vomiting in two of the dogs, they seemed as well as ordinary post-operative animals until within from two to five hours of the end. Then the animal would become noticeably dull and apathetic. Slight muscular tremors began. The gait became difficult and sidling. The hind legs especially seemed ataxic and the animal frequently staggered sidewise with his hind quarters. Weakness and muscular tremors rapidly increased, the pulse became remarkably weak and thready. Vomiting was usually absent. There was no noticeable abdominal distention. There seemed to be no pain. This picture is described in some detail because it is the same that was met with in the various experiments subsequently performed, and will not be again rehearsed.

As was said in the first instance, we were struck by the fact that we had here a fatal experimental condition, certainly closely resembling ileus, yet much simpler, for if one assumed that the obstruction of the loops was the cause of death, any part that might conceivably be played by the bile, pancreatic secretion, and gastric juice, in clinical death from obstruction, was reasonably well eliminated here. The same could also be said of products derived from ingested food stuffs. To remove any question as to the possible significance of the small amount of these substances that remained enclosed within the loop at the time of operation, five dogs were prepared in which at operation the loop was washed through with two or more litres of water, until the washings came away entirely clear.

To illustrate this group we quote the following experiment.

Operation November 9, 1911, 6 p. m. The usual loop of duodenum was isolated by division and washed through with two litres of sterile water. The ends of the divided intestine were all closed. The loop thus occluded was dropped back into the abdomen and a posterior gastro-enterostomy done. Closure.

November 10, 3 p. m. Dog listless, slightly ataxic, tremors, 4.30 p. m. Much weaker. Marked staggering. 8 p. m. found dead.

Of this series one dog died in twenty-seven hours and one in forty-eight. The other three were killed in twenty-four, twenty-eight and forty hours, respectively. This was done in order to secure ante mortem blood for study. It would appear from this series that washing the loop somewhat prolonged life, but the series is too small and the difference too slight to attract attention. Nor do we maintain that every dog so prepared would die within the limit of forty-eight hours, the limit attained by our longest post-operative life. Sufficient cases are here recorded to prove, however, that these high loop occlusions are rapidly fatal.

In view of the importance attributed by certain writers, notably Murphy and Vincent, to the part played by vascular disturbances and to simplify still further the experiment, another modification was made in the operation. Instead of the division and inversion of the ends of the loop, which necessarily involves a certain amount of interference with circulation, in five dogs the gut was not cut. Occlusion was secured by tight double ligatures at either end of the loop, passed between the mesenteric attachment of the gut and the arcade of vessels in the mesentery. The vessels were quite undisturbed and the only vascular interference was in the narrow circle of gut immediately within the grip of the ligatures. This constricted area was covered by approximating the serous surfaces of the gut above and below the ligature with mattress sutures, thus burying the ligatures. The washing was done by introducing tubes through small incisions in the bowel wall, which were afterward carefully closed. In order to avoid injured areas within the loop under observation, these wounds were made, respectively, above the point selected for the oral ligature and below that for the aboral ligature, the irrigation being

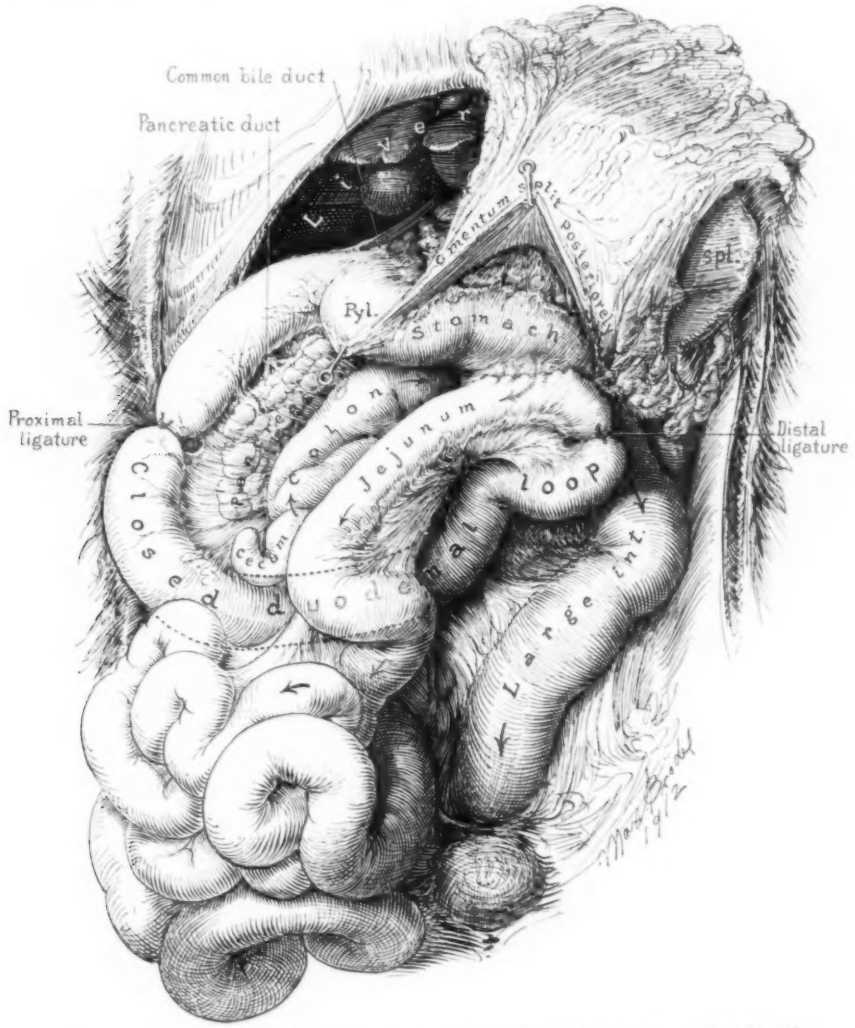


FIG. 1.—The usual type of operation in making a closed duodenal loop showing the portion of duodenum involved.

limited to the gut between the two incisions for the tubes by placing temporary intestinal clamps just outside the limits of these two incisions (Fig. 2).

Of this series the following case will serve as an example. Operation January 19, 1912, 2 p. m. Loop washed and ligated above and below as just described. Posterior gastro-enterostomy. Closure.

January 20, 3 p. m. Dog showing toxic symptoms. Killed to secure material for study.

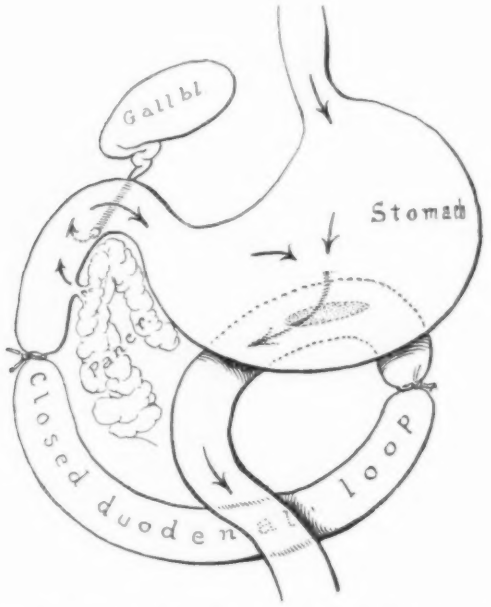


FIG. 2.—Diagram to show the path of secretions around the isolated duodenal loop.

AUTOPSY FINDINGS.

Dogs which die as the result of a closed duodenal loop present a pretty uniform picture. It makes very little difference whether the death results in 24 hours or 72 hours. We may describe the general picture as follows: The thorax, heart and lungs are negative. The spleen, pancreas, kidneys, adrenals and blood vessels are normal. The peritoneal surface usually shows a slight amount of peritonitis over the closed loop, gluing it to the adjacent loops of bowel. This is a dry plastic peritonitis with grains of fibrin and some injection of the serous surfaces, but no exudate. The peritoneum is dry rather than moist. The liver may show some congestion and in some cases a little fatty degeneration. The *closed loop* is practically the only structure that deviates from the normal. It is invariably enlarged and distended with fluid, its walls often mottled with purple areas of hemorrhage and stippled with grains of fibrin. In some cases there may be greenish or charred looking areas in the wall where there is obvious necrosis and we have observed one case where there was a rupture through such an area with escape of the fluid into the peritoneum and death in 27 hours.

The fluid in the loop is very characteristic, a dirty slate or dull red colored fluid, about the consistency of thick soup, often containing considerable mucus, blood and desquamated mucosa. The odor is unpleasant and suggests hydrogen sulphide. The mucosa of the loop may be intact and show only a diffuse reddening and swelling but more often is specked with ecchymoses or shows shallow ulcers with red swollen margins. The inverted ends of the loop may show some digestion and hemorrhage.

The stomach usually contains a considerable excess of bile stained fluid, but the mucosa is normal. The intestine is usually quite clear and presents a pale normal mucosa.

Microscopical sections show normal organs except possibly in the case of the liver where there may be some fat present in very tiny droplets and an excess of polymorphonuclear leucocytes in the capillaries. The duodenal loop shows an acute inflammation, especially in the region of ulcers when they are present. There may be necrosis, hemorrhage, oedema and a marked infiltration by wandering cells, particularly the polymorphonuclear type. Other parts of the loop may show merely a trifling oedema and superficial inflammation involving only the tips of the villi.

The individual variation of dogs to the poisonous action of this closed loop is considerable, but it is unusual for a dog to live longer than 48 hours. If a dog is killed with ether at the end of 24 hours when he does not seem much intoxicated, the findings at autopsy are very different from those described above in the fatal cases. In this instance, the viscera are quite normal. The peritoneum shows a few grains of fibrin and a loss of gloss, due to the slight peritoneal injury necessitated by the operative trauma. The duodenal closed loop in this instance is collapsed and quite flabby. On opening through the wall one sees an intact mucosa which is of a dull pinkish color and slightly swollen. There are no ulcers or hemorrhages. The loop contains no fluid but only one or two cubic centimeters of thick tenacious brown or blood-stained mucus. Yet this material when washed out carefully with water can be shown to contain large amounts of the toxic substance present in the duodenal fluid so abundant in the fatal cases.

Microscopical study shows normal organs. The duodenal loop is lined by a mucosa which is practically normal. There is a trifling injection of some of the capillaries in the villi and a few leucocytes sometimes in such areas.

A possible explanation of the result noted is that we had thrown out of function an organ essential to life. An analogy to an excretory organ like the kidney, or an organ of internal secretion perhaps, might be assumed. To secure evidence in this direction we excised the loop in question, since if either of the above suppositions were correct, it would presumably be quite as fatal to excise as to occlude the loop. A number of attempts were made which resulted unsuccessfully, the dogs dying after a number of days of various incidental conditions including distemper, pneumonia, and intussusception. One dog, however, lived in good condition for eight weeks after this particular loop had been excised. One such positive result

is sufficient to show that this part of the duodenum is not essential to life.

As has been said, we found that drainage of the occluded loop saves the animal's life. We have successfully repeated this experiment, and dogs have lived with closed duodenal loop and fistula for six or eight weeks. It is not an easy operation to perform, however. A number of attempts failed and all for the same reason. After living a variable period, from two to five days, the drainage became insufficient either from inflammatory swelling of the ends of the loop with closure of the lumen, or from a sphincter-like action of the recti muscles, or from occlusion by blood clots. These dogs died with the symptoms before noted and were found to have loops distended with the same material encountered in the closed loops. In the dogs which survived, the symptoms of intoxication had begun to develop when prompt irrigation of the loop, repeated on several occasions until spontaneous drainage became free, abated the evidence of obstruction and undoubtedly saved the animals' lives.

From these facts, the obvious inference is that the loop contains some highly poisonous material. The conclusive proof of this fact is shown by the injection of this material into normal dogs, the effects of which will soon be described. We have undertaken a few experiments to compare the high loop which has been the exclusive subject of consideration hitherto, with other parts of the small intestine. It is well known, as has been noted above, that high obstructions are more rapidly fatal than low. It has been shown by several investigators, possibly first by Halsted,[7] that dogs with isolated loops from the low ileum may live for several weeks or months. We therefore attempted no control series of low loop dogs from the point of comparative post-operative longevity, using them simply as a source of material for comparison with that obtained from the high loop dogs. It is worthy of note, however, that even a low loop dog which, owing to some technical error, developed peritonitis, lived six days, far beyond any period reached in our series of high loop dogs.

We believe that we may fairly conclude from these data that the cause of death is to be sought in the absorption of some toxic material within the closed loops, and that the high loops contain more of this material or a more active form of it, than the low loops. There seem to be but two possible sources for this toxic material—secretions from the mucous membrane of the loop, and the products of bacterial life within the loop. At present we feel strongly that the secretory theory is the more probable, and, although unable conclusively to exclude bacteria from any part in the toxin production, we believe that such part, if it exists at all, is subsidiary in importance. This in spite of the work of McClure,[8] who showed the enormous multiplication of organisms that takes place in the contents of obstructed loops. The facts upon which these opinions rest are the mechanical removal of most of the bacteria by washing the loops; examination of the loop contents culturally at death, which shows abundant but not enormous numbers of organisms; the rapidity of death in the high loop dogs, which seems almost too quick to be caused by elaboration of bacterial toxins; and the fact which has made so much impression on other observers, that in the low loops where organisms are so preponderatingly more numerous death may not supervene for weeks or months. A decisive experiment would be the complete destruction of either the mucosa or the bacteria. So far we have not been able to secure such a crucial test. Efforts to destroy the mucosa by means of chemical agents have failed in this but have quickly killed the animal itself. However, we hope that further researches in this direction may be more successful in the near future.

The death of animals in which obstruction was uncomplicated by any circulatory interference, a result corroborated by the work of Hartwell and Hoguet just published, makes it difficult to accept the importance of this factor in death from ileus, so emphasized by Murphy and Vincent. Of course it is quite true that when one adds to obstruction of the intestinal lumen an infraction of the gut produced by profound circulatory interference, as was done by Murphy and Vincent, there is every reason to expect more fulminant and disastrous reactions than in simple obstruction alone. But to assume therefore that the circulatory interference is the vital factor in the production of the typical symptoms of ileus is not only an unwarranted deduction as a matter of logic, but is contravened as a matter of fact by the observations of Hartwell and Hoguet and by our own. It is obvious that the demonstration of the rapidly fatal results from isolation of washed high loops, and of the highly toxic nature of their contents, consisting only of secretion and some bacteria is not without scientific interest. It at least suggests the value of further study of abnormal intestinal secretion from this point of view, nor is the matter devoid of some practical interest as well. We realize that our experimental conditions do not duplicate exactly the condition of clinical ileus, but the relation is certainly close. In an obstructed bowel encountered at the operating table, containing food substances, bile, gastric and pancreatic juice, as well as the intestinal secretion proper, there may be and quite probably are numerous other toxic bodies besides those whose presence we have demonstrated. But the latter alone are sufficient to cause rapid death, and our loop experiments have shown the importance of thorough and early drainage, especially in high obstruction. Washing the stomach and regurgitant fecal vomiting may be compared to the incomplete drainage that was unable to save a number of our dogs. The suggestion also arises that in those cases of obstruction where the surgeon is in doubt whether to close the abdomen or establish intestinal drainage (and perhaps no problem requires nicer surgical judgment), a border line case when situated low in the gut might be safely closed, and should be drained if placed in the upper loops. This in spite of the well known risks of skin digestion and starvation with high enterostomies. The danger of rapid toxic death is a more pressing consideration than either of these objections. Lastly there is the not unreasonable hope that a further study of the toxins, whose origin and properties are somewhat narrowed down by this work, may put into our pos-

[7] Halsted, W. S.: Am. J. M. Sc., 1887, XCIV, 436.
[8] McClure: J. Am. M. Ass., 1907, XLIX, 1003.

session some means of combating their effects, pending surgical relief of the mechanical conditions that make them dangerous. Already we have some suggestive evidence that a dog injected with a sub-lethal dose of the toxic material is not so rapidly killed by obstruction.

Toxic Substances Present in the Closed Duodenal Loop and Their Action upon Normal Animals.

The "duodenal fluid" which accumulates in these closed duodenal loops may be presumed to contain the toxic substance or substances responsible for the death of these animals suffering from intestinal obstruction or occluded intestinal loops. We expect to give a detailed account of these findings in the near future, but will outline here the facts which have come out of this work up to the present time.

This duodenal fluid is usually faintly alkaline to litmus, but contains no hydrogen sulphide as its odor suggests. It coagulates into a firm mass at the boiling point and a considerable precipitate comes down on heating at 60° C. for 10-20 minutes. This fluid may be heated at 60° C. for hours, centrifuged at high speed and filtered in any way desired without lessening in any way its toxic powers. This procedure gives a dirty brown or slate colored, opalescent fluid with characteristic odor. This fluid is very toxic to normal animals and 10-20 cc. introduced intravenously will usually kill a healthy dog of 10-15 lbs. weight.

The reaction of a healthy dog to this fluid introduced intravenously is so characteristic and constant that we need only describe one experiment. Following the injection, as a rule, there is a rapid fall of blood pressure followed by a prompt return to normal, but this is not invariable and is of no importance. This prompt depressor action can be produced by any type of extract made from the intestinal mucosa. The important vascular reaction is a slow steady fall in blood pressure which may not be evident before 30-60 minutes but progresses to a very low level and is associated with a slight slowing of the pulse. This fall is accompanied by a great dilatation of the vessels in the splanchnic area and probably in great part dependent upon it. At this time the blood is incoagulable or clots very slowly and will inhibit normal blood coagulation. Antithrombin is present often in great amounts. There is increased secretion of fluid in all the intestines with appearance of fluid stools from the rectum. The temperature of the animal falls rapidly in spite of the presence of abundant artificial heat, reaching even 30° C. (rectal) shortly before death. The blood pressure in dogs fatally poisoned never returns to normal, but rather sinks slowly even to ¼ or ⅕ that of normal. The respiration becomes very slow and gasping with prolonged and forceful inspiration. The pupils are widely dilated.

Death supervenes usually in 2 to 6 hours, and if the dog lives 12 hours one may expect a rapid recovery to normal during the following day.

The autopsy findings in such a dog fatally poisoned by the duodenal loop fluid are very constant. The blood shows considerable concentration, yielding perhaps only ¼ to ⅓ its volume of plasma after centrifuging. The dried weight may go as high as 26% or 27%. The heart contains but little blood, as most of it is to be found in the splanchnic area. The blood usually clots very slowly or not at all, due to the presence of an excess of antithrombin. The serous cavities, heart, lungs and kidneys show nothing of interest. The spleen, liver and pancreas show engorgement and the liver may feel very tense and friable. The splanchic veins in the mesentery and serosa of the intestines are very conspicuous. The stomach shows a pale mucosa usually but may show some reddening of its cardiac portion. The pyloric portion is always pale. The *duodenum* beginning one centimeter below the pylorus shows a *deep red* or *purple* velvety mucosa which contrasts vividly with the pale mucosa just above it. This purple mucosa may be coated with more or less mucus and associated with a good deal of thin watery fluid. This condition usually is less intense in the jejunum and fades to a pink or pale red in the ileum. The large gut may be free from this change or present a deep red mucosa.

Histological study shows nothing of importance in the viscera. The purple color of the mucosa of the small intestine is seen to be due to a great engorgement of all the capillaries in the villi. There is no inflammatory exudate here. There may be some escape of blood into the stroma of the villi or into the interglandular tissue of the mucosa (large intestine) but this is usually absent or inconspicuous.

This *toxic substance* or compound seems to act particularly upon the splanchnic vessels and this is probably its dangerous feature. We have been interested to determine, if possible, what the nature of this substance might be, but have only a few points to offer as yet. It is removed from the duodenal loop fluid by heat at 100° C. which causes a massive coagulation. It is not destroyed by autolysis at 38° C. with chloroform and toluol even after a period of 6 to 8 weeks.

It is not destroyed by pancreatic digestion for at least seven days. It is not destroyed by putrefaction for a few days, but we cannot say positively about prolonged action of bacteria.

It is probably destroyed by hydrolysis with 5% sulphuric acid for 6 hours at 100° C. but this point too is uncertain at present. This substance does not stimulate the pancreas to activity as does "secretin," for instance. The toxic material is equally powerful whether introduced into the jugular or into the portal vein.

We have been unable to obtain this substance in any manner except by obstruction of an intestinal loop. The blood in animals which are moribund from the effects of a closed duodenal loop, is not in any way toxic to a normal dog. Autolysis of normal intestinal mucosa at 38° C. with chloroform and toluol for days or weeks furnishes no toxic material. Autolytic material from one entire normal intestine will not injure a small dog, whereas the autolysed mucosa from a closed duodenal loop 15-20 cm. in length will yield a fatally poisonous substance. Putrefaction of the intestinal mucosa gives a very unpleasant fluid but this heated at 60° C. and filtered is not toxic, even in large amounts, up to 50-70 cc. Hydrolysis with 5% sulphuric acid at 100° C. using normal intestinal mucosa

or tissue from various organs will not yield any similar toxic substance.

It may be objected that this substance is not the one concerned in the intoxication of the animals with closed duodenal loops but careful analysis offers many points of similarity.

The animals injected with the duodenal loop fluid show a slowly falling blood pressure and temperature, which symptoms are present too in the dogs with closed duodenal loops. The injected animals excrete large amounts of fluid into the intestine, causing diarrhoea and escape of fluid from the rectum even under anaesthesia. This pouring out of fluid into the intestines is a striking feature in any high intestinal obstruction and conspicuous even in these duodenal loop dogs.

The mucosa of the closed duodenal loop shows abnormal reddening and injection—not comparable, however, it is fair to say, to the mucosa of the injected dogs. The manner of death in profound shock with very slow deep gasping respiration is very similar in the dogs with closed duodenal loops and the animals injected with the duodenal loop fluid. We have some evidence too that repeated injections of duodenal loop fluid in sublethal doses makes an animal more resistant to large doses of this duodenal fluid and most important of all *resistant* to poisoning by a closed duodenal loop made in this animal at some later time. This too speaks in favor of this toxic factor being one and the same in the injection experiments and in the closed duodenal loop experiments. Because of the individual variation of dogs to this poison much evidence must be accumulated to establish this point.

It will occur to one at once that the picture of *anaphylaxis* in dogs presents many features in common with the poisoning due to injected duodenal loop fluid. Recently a healthy dog (weight 21 lbs) sensitized to human serum was injected with a large amount of human serum (140 cc.) after an interval of one month. The blood pressure promptly fell and remained low until death in two hours. The blood clotted very slowly. The temperature fell rapidly. The viscera at autopsy were negative except for congestion. There was an escape of semi-fluid stools during the last hour of life. The *intestinal tract* presented many interesting points. The stomach was normal. The duodenum was somewhat injected and mottled purplish red. The jejunum and ileum showed a velvety red mucosa, the color becoming more intense in the ileum, very similar to that described in the dogs poisoned with the duodenal loop fluid. The distribution here was different, being more intense in the ileum instead of the duodenum. The mesenteric vessels were all very conspicuous. The striking similarity of this picture (anaphylaxis) with that of poisoning by duodenal loop fluid suggests a possible relationship between this substance elaborated in the closed intestinal loops and the substance which is set free in the dog's body following the second injection of a foreign proteid.

SUMMARY.

High loop obstruction in dogs causes very rapid death, 24 to 60 hours as a rule, even when the loop contains no food material nor secretion from the stomach, liver and pancreas. Low loops (ileum) of similar nature are much less rapidly fatal.

Surgical drainage of this loop will save the dog's life.

Excision of this duodenal loop does not necessarily disturb the animal's health.

The material obtained from obstructed loops is toxic when injected into dogs, the high loop material being much more toxic. This material causes profound splanchnic paralysis with extreme congestion of all this area—particularly the small intestine.

The toxic material introduced into normal animals produces many changes similar to those found in the animals with closed duodenal loops—namely, low blood pressure and temperature, excretion of large amounts of fluid into the intestinal canal and fatal shock.

This toxic substance given in a single injection causes a reaction in the dog which is almost identical with the picture of anaphylaxis in this animal.

The toxic material is not injured by heating at 60° C. for any length of time, centrifuging and filtering in any manner. It is not impaired by prolonged autolysis, by pancreatic digestion and bacterial fermentation. Hydrolysis with dilute acids probably destroys it.

No such toxic substance may be obtained by autolysis, digestion or putrefaction of the normal intestinal mucosa.

Injections of sublethal doses of this toxic material will protect against subsequent large doses and probably prolong life after a closed duodenal loop has been established.

PRIMARY CARCINOMA OF THE LIVER.*

By M. C. WINTERNITZ, M. D.

(From the Pathological Laboratory of the Johns Hopkins University.)

The fundamental problems of the pathology of primary carcinoma of the liver are still unsettled. They relate to the histogenesis of the tumor, its relation to cirrhosis of the liver, the origin of the multiple tumor nodules, their growth and the absence of extensive extrahepatic metastases. After a brief review of the views concerning these subjects the results of the study of six cases of primary cancer of the liver will be reported.

General Considerations.—Primary cancer of the liver is very rare occurring only in .28% (v. Hansemann[1]) to 3% (Goldzieher and v. Bokay[2]) of all autopsies in the various statistics.

* A more detailed article including complete case reports will be published in the next volume of the Johns Hopkins Hospital Reports.

The latter percentage is high, and the incidence of the tumor as given by most authors is less than 1%. It is most frequent in adult males, but is relatively common in adult females. It may occur at any age, and a few cases have been described in infants. Clinically the condition is difficult to differentiate from cirrhosis of the liver. Its rapid course, the presence of an enlarged irregularly nodular liver, hemorrhagic ascites or metastases in accessible regions, which is exceedingly rare, may be of assistance in the diagnosis.

Histogenesis.—The presence of bile pigment is of relative value in the differentiation of cancers arising from the liver cells from those arising from the bile duct epithelium. While bile stained tumors are, as a rule, derived from the liver cells, tumors arising from the epithelium of the smaller bile ducts may contain bile pigment within their lumina (Fischer,[3] Herxheimer,[4] Loehlein[5]). Microscopically these two groups may be differentiated by the following characteristics: They tend to conform to the structure of the tissue from which they arise, the bile duct cancers are, as a rule, tubulo-adenomatous, the liver cell cancers trabecular in structure (Hanot and Gilbert,[6] Eggel,[7] etc.). Their cells tend to conform to the cell of origin, those of the bile duct cancers are cubical or cylindrical with clear protoplasm and chromatin rich nuclei, those of the liver cells are larger, polygonal or polyhedral with a granular protoplasm and more vesicular nuclei (Goldzieher and v. Bokay,[l.c.] etc.). The stroma is of greatest importance. The bile duct cancer always has a connective tissue stroma which divides it into alveoli, while the liver cell cancer only has a capillary stroma and is composed of this stroma and the columns of tumor cells alone (Weglein,[8] Dibbelt,[9] Yamagiwa[10]). Through anaplasia the liver cell cancer in areas may form rosettes, where several rows of cells are arranged with their long axis perpendicular to the axis of a central canal, or they may assume a tubular structure (Goldzieher and v. Bokay,[l.c.] Yamagiwa,[l.c.] etc.).

Relation to Cirrhosis.—Liver cell cancers occur with cirrhosis in from 75% to 100% of the cases reported by Eggel,[l.c.] Yamagiwa [l.c.] and Goldzieher and v. Bokay,[l.c.] while bile duct cancers are associated with cirrhosis less frequently, 42% to 62% in the same statistics. In most instances the cirrhosis is annular, but other forms and those consequent upon syphilis, chronic passive congestion (Yamagiwa) and parasites such as schistosomen eggs (Yamagiwa) and echinococcus cysts have been described (Bamberg, Dibbelt,[l.c.] Loehlein [l.c.]). It seems, therefore, that cancer of the liver may be associated with any disease of the organ where there is a regeneration following an injury.

Every possible hypothesis regarding the relation of the cirrhosis to the tumor formation has been advanced: (1) The two processes were considered entirely independent by Kelsch and Kiener,[11] Frohman,[12] etc. The latter came to this conclusion because the most cirrhotic areas in his preparations were free of tumor nodules. (2) The opinion that both conditions resulted from a common cause has been adandoned, since in some cases the cirrhosis was of syphilitic or parasitic origin. (3) The third possibility that the cirrhosis was secondary to the tumor formation had several phases. Marckwald [13] suggested that the irritation of the tumor development led to cirrhosis even in those portions of the liver uninvolved by the growth. This did not seem plausible since similar tumors occurred without cirrhosis. On the other hand with extension of the cancer into the capillaries, atrophy and necrosis of the liver cells may result followed by condensation and new formation of connective tissue (Ziegler[14]). (4) Finally in most instances the cirrhosis precedes the cancer and is the direct cause of the neoplasm. This theory was first advanced by Sabourin.[15] Schmieden[16] went further and regarded the hyperplastic liver cell islands so common in cirrhosis as the precancerous stage. This has been upheld by most of the subsequent writers (Eggel,[l.c.] Theodorow,[17] Weglein,[l.c.] Loehlein,[l.c.] Milne,[18] Goldzieher and v. Bokay,[l.c.] Yamagiwa,[l.c.] etc.). These authors do not offer Ribbert's theory concerning tumor formation but believe that consequent to injury there is destruction of liver tissue which is followed by regeneration. As a result of a repetition of this cycle, following Weigert's conception, certain cells through proliferation exceeding their goal become cancerous.

This hypothesis has been utilized further to explain the greater frequency of liver cell to bile duct cancers with cirrhosis. After experimental injury the connective tissue liver cells and bile ducts all take part in the repair. The liver cells are the most active (Podwyssoski) and it may be concluded that they have a greater proliferative capacity and therefore are more often stimulated to cancer formation.

Mode of Growth.—The transition pictures described at the periphery of the smaller tumor nodules are in large part responsible for the confusion which still exists concerning the mode of growth of the cancer. It was believed that the columns of liver cells were in many instances directly continuous with the columns of tumor cells and that the capillaries of the liver and tumor were directly continuous in these areas (Schuppel,[19] v. Heukelom,[20] Travis,[21] etc.). This led to the conclusion that the tumor increased in size by a progressive metamorphosis of liver cells to tumor cells as had been described by Waldeyer in skin cancer and Hauser in gastric cancer. On the other hand, Heussi [22] believed that the above transitions were artifacts brought about by the tumor cells growing between the capillaries and destroying the liver cells. He consequently denied appositional growth and was sustained in this by Ribbert.[23] Herxheimer,[l.c.] Fischer,[l.c.] Eggel,[l.c.] etc. The latter pointed out that similar transition pictures occurred in metastatic growths where the secondary nature of the tumor was unquestionable (Ribbert, Perls, Naunyn, Schmidt). Weglein [l.c.] described similar transitions in the center of nodules of primary cancers of the liver and considered them to be artifacts possibly dependent upon a difference in the appearance of tumor cells at different ages, etc. The transition pictures have received decreasing attention in recent years. They either have not been observed at all or are found rarely (Eggel,[l.c.] Goldzieher and v. Bokay,[l.c.] Yamagiwa [l.c.]). Those authors who emphasize the above transitional pictures advocate the multicentric origin of the tumor (v. Henkelom,[l.c.] Travis,[l.c.]

Loehlein [l.c.] (one case), Goldzieher and v. Bokay,[l.c.] Yamagiwa,[l.c.] etc.). Yamagiwa contends that cancer of the liver is multicentric in origin since both forms frequently arise on the basis of a regeneratory hyperplasia of liver cells or an inflammatory hyperplasia of bile ducts, both of which occur in many areas: i. e., multicentric.

Heussi [l.c.] and his teacher, Ribbert,[l.c.] stand alone as advocates of the unicentric origin of cancer of the liver though their theory has been accepted in individual instances by Weglein, Loehlein, Fabian,[28] etc. They emphasize the well known fact that the tumor invades the portal vein by predilection. It may then fill the portal and even the hepatic vein with cancer thrombi and in such cases these thrombi cut in cross section will give the appearance of multiple tumors. Ribbert says in several instances it was possible to pull the tumor out of the branched bed of the portal vein in cast-like form and in this way by far the greater part of the tumor could be removed from the liver. In other instances, where the occlusion of the vein is not so evident, the multiple tumors result from embolic transplantation of tumor cells broken off from the primary tumor which has invaded the vascular stream.

Relation to Adenomata.—On account of the frequent occurrence of cancer of the liver with cirrhosis, it is believed that most of these tumors pass through the benign stage of nodular hyperplasia or adenoma. The cases unassociated with cirrhosis are considered by Ribbert,[l.c.] Yamagiwa,[l.c.] etc., to arise from misplaced embryonic rests. They are confirmed in this view since cancer of the liver without cirrhosis is most frequent in childhood.

Extrahepatic metastases occurred in 66 of the 163 cases collected by Eggel.[l.c.] They occur earlier and are more frequent in cancers arising from the smaller bile ducts than from those of the liver cells. Those from the liver cell cancers are never extensive and form inconspicuous nodules in the thoracic and mesenteric lymph glands, lungs, etc. The almost constant invasion of the venous system makes the infrequency of metastasis more obscure. Weglein believes that they may be encapsulated or destroyed in the pulmonary vessels.

During the past year several cases of primary liver cell cancers were observed. These offered confirmatory evidence of certain of the above views and as a result the six cases occurring in the pathological services of the Johns Hopkins Hospital and Bay View Hospital were examined. The results will be briefly summarized.

General Consideration.—Three cases occurred in the first 3700 postmortem examinations at the Johns Hopkins Hospital, a percentage of 0.8. In four cases where this was ascertainable the disease occurred in adult males between the 4th and 6th decades. Clinically they corresponded to the usual types.

Histogenesis.—In all of the above cases the tumor originated from the liver cells themselves. The cells of the tumor resembled the liver cells. They were somewhat smaller, had a less regularly granular protoplasm which had a much greater affinity for hæmatoxylin than the protoplasm of the liver cells. With hæmatoxylin and eosin the protoplasm of the tumor cells stained pale blue while that of the liver cells stained pink. The nuclei were, as a rule, larger and more vessicular than those of the liver cells, but the size of the nuclei and their chromatin content varied considerably and small pyknotic ones were not infrequent. Mitotic figures were always demonstrable in the tumor nodules, and cells with several nuclei were found here and there.

The tumors had a trabecular structure and were composed of columns of cells similar to those of the normal liver acini, though, as a rule, these columns were much thicker and often had ten or more cells abreast. In some instances these were so thick that solid nests of cells were formed. Between the columns or surrounding the solid nests was a layer of endothelial cells. These were part of the capillary stroma, which occurred throughout the tumor. No definite connective tissue stroma was to be found in any of the cases. In some instances the tumor had a more glandular structure. All transitions occurred from simple crevice-like dilatations between the cells of the columns to lumina, similar to those of the bile ducts and rosette-like nodules. The latter were composed of a variable number of rows of tumor cells arranged with their long axis perpendicular to a central lumen as in a perithelioma. The various cavities in the tumor nodules cut longitudinally were short and the cells surrounding many of them were compressed. Their possible production by simple dilatation of pre-existing intercellular spaces or bile capillaries as suggested by Yamagiwa, etc., seems plausible. The more definite structures, like the rosettes which occurred particularly in the tumor thrombi, are probably the result of a reversion of the tumor to the embryonic structure of the liver. These glandular and tubular structures were not sufficiently conspicuous in any case to confuse the picture.

Necrosis occurred particularly in the larger tumor thrombi and in many smaller tumor nodules. In many of these there were multiple centers of necrosis and in this way false glandular structures were produced. Cells in process of disintegration often resembled the normal liver cells closely. Their protoplasm stained pale pink and their nuclei were smaller and more deeply staining.

Relation to Cirrhosis.—In all of the cases there was a marked cirrhosis besides the multiple tumor nodules. In two, however, relatively large areas of liver, uninvolved by tumor nodules, were entirely free of the cirrhotic process. On further examination, the following facts, which, of course, are well known, but which are not usually emphasized, became evident: The liver suffers greatly from the presence of the tumor. The tumor nodules compress the surrounding liver tissue which may be seen as concentric layers of more or less atrophied columns of liver cells. In many places the liver cells have entirely disappeared, and in their place there is a condensation and a fibrosis of the preexisting stroma. This appears as dense bands of fibrous tissue more or less completely surrounding the larger tumor nodules. In other areas the plugging of the vascular trunks results in a tremendous dilatation of the intraacinar capillaries. This is associated with

an atrophy of the liver cells and in some areas these processes are so extensive that a picture similar to an angioma is produced. In still other areas definite necrosis of the hepatic parenchyma occurs probably brought about by the extensive tumor thrombi.

In these three ways, at least, fibrosis may result from the effect of the cancer upon the hepatic parenchyma and bring about a cirrhosis secondary to the tumor growth. An analogous process was described by Ziegler l.c. in his text-book, but Eggel was unable to find any similar cases in his exhaustive review of the literature in 1901, and since his time the possibility of a picture simulating a true cirrhosis, but secondary to the tumor growth, has not been emphasized. In some instances, also, so much of the liver is involved by the tumor that it is difficult to obtain areas, of any sufficient size uninvolved by tumor, to study the cirrhotic process, and in these it may be impossible to determine the relation between the two conditions.

In four cases the cirrhosis was marked even in those areas uninvolved by tumor. It is, therefore, evident that the cirrhosis is not entirely dependent upon the new growth in all cases and the general consensus of opinion, that the cirrhosis precedes the neoplasm, is probably correct. Whether a picture of cirrhosis may be produced secondary to the tumor growth cannot be said with certainty from the other two cases. It is evident that the cirrhotic process is exaggerated greatly, both macroscopically and microscopically, as a result of the innumerable tumor nodules scattered through the hepatic parenchyma.

Mode of Growth.—In order to understand the nature of the transition pictures between liver and tumor cells at the periphery of the tumor nodules, and the apparent multicentric origin of the neoplasm, the grosser details of the tumor growth will be considered first.

In all of the six cases many of the blood vessels contained tumor thrombi. In several, where the entire liver could be studied, these tumor thrombi were by far the most conspicuous part of the growth. They formed long strands and streamers which could be followed through and dissected from the portal vessels. Nodular enlargements were also found along their course and these even occurred at the very periphery just under the capsule of the liver. Naturally the conclusion was reached that the tumor started in one area invaded the portal system, and in this way involved more or less of the liver secondarily. This was the more interesting since a preceding report of one of these cases from this laboratory had considered that the tumor was multicentric in origin, and that transitions between liver cells and tumor cells were demonstrable at the periphery of the nodules.

These cases were, therefore, carefully investigated. In two the extensive macroscopic tumor thrombi were confirmed and emphasized by the microscopic picture. The great majority of the tumor nodules were contained within the portal veins. The vessel wall in most instances still had an intact endothelial lining, the elastica could be readily stained and where these were not sufficient serial sections showed the connection between the tumor nodules and the thrombus. Such a thrombus cut longitudinally showed a most characteristic picture. Its branches corresponded with the vascular bed, and these varying sized ramifications invaded the liver tissue everywhere as larger and smaller strands, sheathed by a varying sized vessel wall in a more or less perfect state of preservation. In one case the large portal vein at the hilus of the liver was invaded by the large tumor in the right lobe of the liver, but as was seen in the gross examination, the thrombus did not invade all of the branches of the vein supplying the left lobe. Microscopically also many of the portal branches were free of tumor cords, but on the other hand, many of the tumor nodules were surrounded by endothelium. Throughout, pictures similar to those described were found, and this was true also of the other three cases.

Pictures suggestive of transitions between liver cells and tumor cells at the periphery of the smaller nodules occurred, but these were rare and they did not form a distinct group. Various relations between the tumor nodules and the hepatic parenchyma were found. Some nodules, as we have seen, were definitely enclosed within a thick walled vein, others invaded the vein wall or grew out through a thinner walled vessel into the hepatic parenchyma. In many of these only remnants of the thinned vessel wall remained in one area. Around these nodules the columns of liver cells were frequently flattened and compressed as above described, while in others, cords of tumor cells ran out into the intraacinar capillaries or through the vein wall into the liver columns themselves. In these latter instances pictures resembling transitions between liver cell and tumor cell occurred. These, however, were rare and in view of the numerous intermediary stages and the vascular invasion, it seemed hardly necessary to assume that these were actually transitions.

The presence, therefore, of a larger nodule in the right lobe of the liver and the extensive plugging of the portal radicals with tumor thrombi led to the conclusion that the tumor was unicentric in origin in all these cases and that the multiple nodules were in part sections of tumor cords which filled the portal vein, in part the result of emboli from the same source. Fabian had reached the same conclusion in regard to his case, as may be gathered from the following sentence: "The invasion of the lymphatics and blood vessels seems to be an important characteristic of this type of tumor, and though no actual invasion was noted under the microscope in this case, it has been seen in other instances. Given an invasion of the portal system with new growth, the diffuse distribution throughout the liver is easily accounted for."

While it is impossible to draw any sweeping conclusion concerning the unicentric origin of primary cancer of the liver from so few cases, there are certain well known facts which strengthen this conception. The very definition of the cancer arising from the liver cells is dependent upon the fact that it invades the blood vessels and only in this way does it differ, in many instances, from the benign adenoma. This was emphasized by all of the older writers and v. Heukelom, l.c. particularly, pointed it out, mentioning its occurrence in more

than three-fourths of the cases reported. In his own cases he could not exclude the possibility that the tumor had invaded the liver through the portal vein but this he considered improbable on account of the pictures of transition. In Eggel's l.c. series, also, venous tumor thrombi were a most frequent occurrence, and it is not unlikely that it occurs in every case where multiple tumor nodules are found in the liver.

With tumor thrombi occurring constantly it would seem that nothing further were necessary to explain the multiple nodules and that they were simply metastases. v. Heukelom could not accept this view on account of the frequent transitions between liver cells and the tumor cells at the periphery of the small nodules. These transitions now, however, have become far less important, and as we have seen are on the one hand not accepted by many and considered as rare occurrences by the remainder. It seems, therefore, that it may be said with reasonable assurance that primary cancer of the liver is unicentric in origin, as a rule, at least, and that in most instances, if not always, the so-called transitions are artifacts. Yamagiwa's l.c. argument that the cancer is multicentric in origin because hyperplastic liver nodules occur in many areas, i. e., are multicentric, may be theoretically correct, but there seems no basis for the assumption that if one hyperplastic nodule acquires cancerous manifestations that this should occur in many such nodules.

The theory that these tumors increase in size by a constant metaplasia of liver cells to tumor cells has been less and less advocated as the so-called transitions became rarer and better understood. In the above cases there was no evidence to support this theory of appositional growth, but the presence of numerous mitoses as is usually found in malignant tumors seemed to indicate that the growth of the neoplasm was entirely autogenous.

Extrahepatic Metastases.—Even though metastases occurred in the lungs in the four cases of the above series where complete protocols could be had, the metastatic nodules were very small. This is not what might have been expected with the extensive vascular involvement that was present. In several instances the tumor grew up the cava and into the pulmonary artery, still there were only a few nodules in the lung tissue.

The absence of extensive extrahepatic metastases in cancer of the liver has been repeatedly emphasized. This is, of course, not unique for this tumor, but the question why certain tumors metastasize generally, while others, like the cancer of the prostate, have a predilection for bone, etc., is of the broadest interest. It is not only true of neoplasms, but occurs likewise with various infectious processes.*

SUMMARY AND CONCLUSIONS.

Primary carcinoma of the liver is a rare condition, occurring in 0.28% to 3% of all autopsies from various statistics.

It occurs most frequently in adult males, but is proportionately relatively common in females and may occur at any age. A number of cases have been described in infancy.

Clinically, the disease is difficult to differentiate from cirrhosis of the liver. Its rapid course, the presence of an enlarged, irregularly nodular liver, hemorrhagic ascites, or metastases to accessible regions, which is exceedingly rare, may be of assistance in the diagnosis.

The tumor may occur in normal or in diseased livers. In a tremendous percentage of cases the liver presents an ordinary type of cirrhosis, but various other types of chronic hepatitis caused by syphilis, parasites, etc., may occur. The tumor itself may be only one large nodule. This may have smaller ones at its periphery and in this way transitions occur until the entire organ is studded with varying sized nodules. Any division between these forms is simply arbitrary and subserves no useful purpose.

The tumor may arise either from the smaller bile ducts or from the liver cells. The names carcinoma cholangiocellulare and carcinoma hepatocellulare may be used to differentiate them as suggested by Goldzieher and v. Bokay.l.c. The liver cell tumor may be bile stained, but this does not differentiate it absolutely from the duct cancer, for bile pigment may be found in the lumina of the latter nodules. The liver cell cancer has a trabecular structure; it is composed of thick columns of cells not very unlike normal liver cells which may be arranged in solid nests and show here and there a glandular structure. Its stroma is always composed of a simple capillary net similar to the interstitial tissue of the liver acinus. The bile duct cancers have a tubulo-adenomatous structure and have a more or less dense connective tissue stroma.

It is generally agreed that the cirrhosis precedes the neoplastic formation where these two are associated. The tumor, however, brings about pressure atrophy directly and necrosis of the hepatic parenchyma through its extensive vascular involvement, and in this way a fibrosis may result secondary to the tumor growth. This is important since in a few cases those areas of liver uninvolved by tumor growth are likewise free of cirrhosis. Whether a cirrhosis may be produced secondary to the tumor is uncertain, but there is no doubt that the cirrhotic process is exaggerated greatly as a result of the tumor growth.

The secondary formation of cancer as a result of a chronic destructive process in the liver parenchyma finds its analogue in many malignant tumors elsewhere in the body. It may be interpreted in the following way: as a result of the destruction there is a constant demand for repair. The cells proliferate and loose their more specific functions until finally the equilibrium between function and growth is lost and certain cells become vegetative. The constant occurrence of the reparative phenomena is manifested in the liver by the hyperplastic liver nodules so frequently found in cirrhosis and these are supposed by many to be the source of the liver cell cancers.

Primary cancers of the liver are differentiated from benign adenomata chiefly by their power to invade the blood vessels. The portal vein is most frequently invaded and all of its radicals may be plugged with tumor thrombi. In some instances practically no tumors remain after the growth in the blood vessels is removed. But in any case where there is an invasion of the portal system the diffuse distribution in the liver

* This has been discussed by me in an article upon Primary Tuberculosis of the Spleen to appear in the June, 1912, number of the Archives of Internal Medicine.

is easily accounted for. The so-called transitions from liver cells to tumor cells at the periphery of the tumor nodules are denied by many, and considered to be extremely rare by most of the rest of the writers since v. Heukelon. In most instances they are probably artifacts brought about by an invasion of the liver acini by the tumor thrombi or emboli. Granted this, there is no longer any basis either for the multicentric origin of cancer of the liver or that its subsequent development is brought about by an appositional growth.

The tumor is not in any respect unique. It is unicentric in origin, distributes itself through the vascular system, forming a more or less diffuse growth in the liver and develops autogenously. The rarity of extensive extrahepatic metastases in view of the tremendous tumor thrombi which not only involve the portal, but also the hepatic veins and the vena cava is worthy of note.

BIBLIOGRAPHY.

1. v. Hansemann: Ueber den primären Krebs der Leber. Berl. klin. Wchnschr., 1890, XXVII, 353.

2. Goldzieher und v. Bokay: Der primäre Leberkrebs. Virchow's Arch., 1911, CCIII, 75.

3. Fischer: Ueber Gallengangs-Karzinom sowie über Adenom u. primäre Krebse der Leberzellen. Virchow's Arch., 1903, CLXXIV, 544.

4. Herxheimer: Ueber einen Fall von Adenokarzinom der Leber. Zentralbl. f. allg. Path. u. path. Anat., 1902, XXXIV, 705.

5. Loehlein: Drei Fälle von primären Leberkarcinoms. Ziegler's Beitr., 1907, XLII, 531.

6. Hanot et Gilbert: Études sur les Maladies du Foie, Paris, 1888.

7. Eggel: Ueber das primäre Karzinom der Leber. Ziegler's Beitr., 1901, XXX, 506.

8. Weglein: Ueber das Adenokarcinom und Adenom der Leber. Virchow's Arch., 1905, CLXXIX, 95.

9. Dibbelt: Ueber Hyperplasia, Adenom und Primärkrebs der Leber. Inaug. Diss. Greifswald, 1903.

10. Yamagiwa: Zur Kenntnis des primären parenchymatosen Leberkarzinoms (Hepatoma). Virchow's Arch., 1911, CCVI, 437.

11. Kelsch et Kiener: Contribution à l'étude de l'adenome du foie. Arch. de Physiol., 1876, 2. s. III, 622.

12. Frohman: Ueber das Leberadenom, etc. Inaug. Diss., Konigsberg, 1894.

13. Marckwald: Das multiple Adenom der Leber. Virchow's Arch., 1896, CXLIV, 29.

14. Ziegler: Lehrbuch der Allgemeinen und Speciellen Pathologischen Anatomie, 1902, II, 702.

15. Sabourin: Contribution à l'étude des lésions du parenchyme hépatique dans la cirrhose. Essai sur l'adenome du foie. Thèse, Paris, 1881.

16. Schmieden: Lebercirrhose und multiple Adenombildung. Virchow's Arch., 1900, CLIX, 290.

17. Theodorow: Zur Kenntnis der primären Lebercarcinom. Virchow's Arch., 1908, CXCIII, 407.

18. Milne: Primary Epithelial Tumor Growths in the Liver. J. Path. & Bacteriol., 1909, XIII, 348.

19. Schuppel: v. Ziemsen's Handbuch, 1878, VIII, 284.

20. v. Heukelom: Das Adenokarzinom der Leber mit Cirrhose. Ziegler's Beitr., 1894, XVI, 241.

21. Travis: A Case of Multiple Primary Adenocarcinoma of the Liver with Cirrhosis. Johns Hopkins Hosp. Bull., 1902, XIII, 108.

22. Heussi: Ueber das Wachsthum des Adeno-carcinoms der Leber. Inaug. Diss., Zurich, 1898.

23. Ribbert: Das Karzinom, Bonn, 1911; Das maligne Adenom der Leber, Deutsche med. Wchnschr., 1909, XXXV, 1607; Lehrbuch der Pathologischen Histologie, 1898.

24. Fabian: A Case of Primary Carcinoma Supervening in a Cirrhotic Liver. Johns Hopkins Hosp. Bull., 1907, XVIII, 351.

A METHOD OF CORRELATED TEACHING OF PATHOLOGY AND BACTERIOLOGY IN THE SECOND YEAR OF MEDICAL INSTRUCTION.

By Frederick P. Gay,

Professor of Pathology, University of California.

The continually increasing scope of each of the medical sciences has of necessity led to a differentiation in the interests of those seriously enrolled in any one of them. For effectiveness it has become essential for the individual to restrict his research in large measure to the single field in which he is most interested. Teaching, too, to be most stimulating and critical would preferably cover only such ground as the instructor can know at first hand. An ideal curriculum, then, in any one of these sciences would consist of a well-balanced, co-operative course covering the entire field and subdivided in such a way that each division may be in charge of an instructor whose first interests are therein represented. It may be that such was the plan in many of the older medical centers, although it is certain that fewer highly trained and whole time men have been available in the past to carry out such a purpose. Even if such were the original scheme of instruction, the essential combination of the scheme was frequently broken, in providing for the independence of an associate in the way of a separate department. It is far from my purpose to advocate any system that militates against the rise and independence of the individual, but the fact seems clear that the essential inter-relation of such a curriculum as will be described would be impracticable in separate departments. It may not be supererogatory to express the belief that individual growth is best fostered by transplantation.

It is the privilege of workers in newer communities to try rather comprehensive schemes of development that would be quite impossible in more traditional surroundings. The method of teaching the second year course in pathology in the University of California is a case in point, and, from its apparent success with small classes of students would seem worthy of description.

In view of the restricted and incorrect use of the term it is not gratuitous to define the science of pathology as concerned with the *entire* natural history of disease. The expression "science of Pathology" is premeditated as expressing an

academic, biological entity, brought to the attention of the medical student in his second year before immersion in clinical interests that of necessity demand a more utilitarian or applied type of pathology. It would seem best, then, to teach students first the broadest possible conceptions of disease processes, considered each as a whole through the successive stages of causation, progress, and effect. Equally effective results are not obtained by the usual method of studying the typhoid bacillus in one term followed months later in another course by a study of the lesions it produces. This artificial separation of bacteriology from morbid anatomy and histopathology, moreover, has apparently not served to accentuate but rather to conceal the usual deplorable hiatus that should be filled by a functional pathology.

The novelty of our method of instruction lies, not so much in an appreciation of its advantages, as in the opportunity for carrying it out. The concentration system has been put in force for the first two years' instruction in our medical school. As a result, the student enters the second semester of his second year (January to May) with physiology, physiological chemistry, pharmacology, and anatomy (with the exception of two half days a week in regional anatomy which includes auscultation and percussion) off his hands. His work in the department of pathology and bacteriology comprises, therefore, four whole days a week (32 hours) for seventeen weeks (544 hours). The average class at present numbers about twenty men and women and the teaching staff consists of three full time ranking men, and one half time assistant. In a general way, the work is divided into three closely correlated parts in each of which one of the full time teachers is particularly experienced and interested and for which he is responsible. The four forenoons of the week are devoted to histopathology, morbid anatomy (including individual experience in autopsy work), the experimental production of lesions in animals, and general histopathological technic. The afternoons are divided nearly equally between general bacteriology and experimental work in infection and immunity. The class exercises both in histopathology and in bacteriology are usually preceded by an introductory talk; more formal lectures in these subjects are regarded as unnecessary in view of the existence of wholly adequate text-books to which students may be referred. A more formal set of lectures, two a week, covers the intermediate field between the better recognized branches of pathology, by discussing the progress of each disease that is being synchronously studied in respect to cause and effect. The elaborateness and practicability of the data of infection and immunity renders their study particularly fitted to represent this field of functional pathology. The rapid development in these subjects, moreover, admirably exemplifies the value of the experimental method in the study of disease.

The barest outline of such a combined method of teaching pathology would appeal at once, but the logical fascination of the scheme and some evidence of its actual didactic value appear more fully in considering details of the work as carried out.

The course begins with an introductory lecture in which an attempt is made to show the intimate relationship between the three parts of the course and their relative importance. It is pointed out that bacteriology and morbid anatomy are subjects of which the methods and the major facts are known; for this reason they are easier to teach and offer less fruitful fields for research. The field of functional pathology is at once less well known and more difficult to teach; it is, however, not only from motives of intellectual curiosity but also from its practical value in aiding diagnosis and treatment of disease, of pre-eminent importance. Owing to the limitations of time and indeed of the instructor, but one phase of functional pathology is emphasized. The data collected under the head of immunology, however, present at once the most accessible and at the same time most practical phase of the subject. It is frankly pointed out that either pathological physiology or pathological chemistry might almost equally well serve to bridge the usual chasm between cause and effect. An attempt is made further to explain the differences between acute infectious, metabolic, chronic diseases, and diseases of unknown origin. With this outline of pathology schematically depicted the actual work is begun.

The forenoons of the first week are occupied by a histological study of human lesions grouped to cover the general aspects of degeneration and pigmentation. This would seem the best method of transition from normal histology to histopathology. Gross specimens whenever available are demonstrated and the class begins work in groups by producing similar lesions in animals, experimental jaundice in the dog by ligation, cloudy swelling and hemoglobinuria due to cantharadin poisoning in the rabbit, phosphorus poisoning, necrosis due to ligation of vessels, and the like.[1] Two men are assigned to each experiment the significance and method of which is explained to them. They are then purposely left largely to themselves with the expectation that they may not succeed in obtaining the results expected on first trial; the experience of failure being regarded as of more value than immediate success. They are, however, responsible, for a report on their work and are expected to demonstrate their results to the rest of the class. The corresponding afternoons of the first week are occupied in learning the standard methods of preparing culture media.

The bacteriological work of the second week includes culture methods for suprophytic bacteria: preparing plate cultures, staining methods including demonstration of spores and the appearance of involution forms in old cultures; and the bacterial production of nitrites, indol, and fermentation in sugar media. The lecture course begins at this point with two lectures on the general problems of infection. The work in morbid anatomy includes the classical types of inflammation in prepared sections, the study of the frog's mesentery, and inflammation of the rabbit's ear by hot water and croton oil. The students who actually prepare these animals for the class demon-

[1] These experiments and many in following days are based on the exercises outlined by Pearce in his admirable article on "The Teaching of Experimental Pathology and Pathological Physiology, etc." Johns Hopkins Hospital Bulletin, 1911, XXII, 404. I am greatly indebted to Professor Pearce for placing advance sheets of his experiments at our disposal before publication.

stration are further taught how to fix, section, and stain the tissues for comparison with the more complete series of slides that have already been given them for microscopic study. The entire class is thus eventually instructed practically in the usual histological methods either from similar experimental material or from post mortem tissues. This work continues in the third week with studies of other forms of inflammation and abcess formation produced by the pyogenic cocci. These pyogens are at the same time being studied in the afternoons both culturally and in connection with exercises on phagocytosis both of the simple and induced type (opsonic). These latter experiments are carried out by the entire class. The lectures of this period cover natural immunity, Metchnikoff's theory of phagocytosis, and phagocytosis as increased by the opsonins of normal serum. Two students inject rabbits, one intravenously, one subcutaneously, with virulent cultures of *M. aureus*, demonstrate the pyemic abcesses when they occur, and carry through the tissues both for technical reasons and for comparison with the lesions on hand. The whole class carries out the Neisser-Wechsberg bioscopic test for leucocidin with materials obtained by injecting rabbits with cultures of *M. aureus*.

During the fourth week abcesses and repair are studied not only anatomically and histologically but experimentally through the preparation of clean and infected wounds in animals. Bacteriologically smears of the meningococcus from the spinal fluid, and of the pneumococcus in pneumonic sputum, are studied. Individuals inject the sputum in a rabbit and a mouse and isolate a pure culture. Cultures of the gonococcus are shown, smears of gonorrhœal pus studied, and cultures of the *M. melitensis* are given out for growth on the various media. The pathogenesis and specific therapy of the coccal infections are considered in lectures.

Histologically the fifth and sixth weeks are occupied in the study of circulatory diseases, embolism, thrombi, infarcts, and the like, supplemented by the experimental production of bland infarcts and thrombi (Pearce: Exercises IV, 1, 3, and 4). Diseases of the heart are likewise covered. The afternoon work of the fifth week is largely concerned with a study of the streptococcus, its production of hemotoxins, group experiments demonstrating positive and negative chemotaxis of leucocytes by virulent and non-virulent strains (Bordet) and experiments to show the protective value of antistreptococcus serum. Lectures discuss hemotoxins and begin the discussion of humoral immunity and are followed the next week by a consideration of bacteriolysins and hemolysins. Coincidently, the cholera group of spirillæ is being studied culturally, and the action of Buchner's alexin in fresh serum, and of Pfeiffer's specific lysin (Pfeiffer's phenomenon) on *Sp. choleræ* are studied by the entire class. The week ends with class work on the artificial hemolysins and a group preparation of lesions produced by injecting hemolytic (hemotoxic) serum in the animal whose corpuscles were used to produce it. Separate groups of students begin at this time the production of various anti-sera by immunizing animals. This individual work has not only served to familiarize the students with methods of immunizing and bleeding animals, and of testing specific sera, but by modifications has actually suggested ways of perfecting these methods.[2]

The first formal lecture of the seventh week deals with the epidemiology, pathogenesis, and means of specific prevention and therapy in cholera; the second with immune opsonins or tropins. In this and the following week the colon-typhoid group of bacteria is studied culturally, with the logical correlation of class work on the specific agglutinin and precipitin reactions which were first worked out with these organisms. The theoretical and practical aspects of agglutination and precipitation are taken up in lectures.

The work in morbid anatomy and histology in the meantime, after dealing with circulatory disturbance, has taken up diseases of the lung (three exercises) and gastritis (Pearce: Exercise VII, 1, 2, and 3) and by the end of the eighth week is considering the lesions of typhoid fever in connection with the corresponding afternoon work on the typhoid bacillus. At the beginning of the next week amœbic and bacillary dysentery are studied, the latter correlated with a bacteriological study of the main types of *B. dysenteriæ* and rounded out by a second of two lectures on epidemiology, specific immunization, and therapy of infections of the colon-typhoid-dysentery group.

At this point, a week is given to the study of tuberculosis, human and bovine lesions, prepared cultures of tubercle bacilli, staining of tuberculous sputum, injection of guinea pigs with tuberculous sputum and the effect of tuberculin on animals previously so infected. Two lectures deal with the intercommunicability of human and bovine tuberculosis and methods of diagnosis, and specific therapy in the disease. Lesions of leprosy are demonstrated, and the streptothrix group of organisms with cultures are then briefly considered.

The anthrax bacillus and *B. mallei* are then studied for a few days supplemented by a lecture on Pasteur's historical method of anthrax vaccination of cattle, the diagnosis of glanders in horses, and a brief consideration of the two diseases as they occur in animals and in human beings.

The work of the eleventh week deals first with plague and chicken cholera, in the bacteriological hours, supplemented by a study of gross and microscopic lesions of the former disease as it occurs in rats and ground squirrels.[3] A lecture takes up the transmission of plague by rodents and method of preventive inoculation. The week ends with study of cultures of the influenza bacillus and of the bacillus of whooping cough. The morphological work, which at this point shows no particular correlation, deals with diseases of the liver, pancreas, and colon.

The work of the following week groups largely about diphtheria and tetanus. Smears from throat cultures sent to the State Laboratory of Hygiene for diagnosis are studied for the

[2] See Gay and Fitzgerald: The intensive method of immunizing rabbits for the rapid production of antibodies. Preliminary report to appear in the Proceedings of Society for Experimental Biology and Medicine.

[3] I am indebted to Dr. G. W. McCoy of the Public Health and Marine Hospital Service for preparations and tissue from this locally important disease.

presence of diphtheria bacilli.[1] Two or three systematic lectures cover the subject of toxins and antitoxins and the practical aspects of antitoxin preparation and standardization is made clear by a day spent in the Cutter Biological Laboratory. The lesions of diphtheria in human cases are studied and the symptoms and lesions following the injection of diphtheria and tetanus toxin are demonstrated in guinea pigs by individual student groups.

The thirteenth week bacteriologically deals with *B. tetani*, anærobic culture methods, and lesions produced by *B. aerogenes capsulatus* (Pearce: Exercise II, No. 4). In no direct relation the morbid anatomy work is devoted to diseases of the kidney (Pearce: Exercise X). The formal lecture discusses anaphylaxis and is followed by a demonstration of anaphylactic shock in the guinea pig. At the end of the week the lesions of syphilis are studied in conjunction with demonstration of a culture of *Tr. pallidum* (Noguchi), Giemsa and Levaditi preparations, and finally lectures on experimental syphilis and the Wassermann reaction.

Morbid anatomy and histopathology continues for the forenoons of four weeks more and is in no constant correlation with the afternoon work. Tumors are studied for three weeks with an afternoon lecture on the experimental study of malignant tumors in animals. The final week deals with lesions of the central nervous system.

The afternoon work during this period extends from the work on syphilis to a general consideration of protozoan diseases and diseases of unknown etiology. Trypanosomes with smears from an infected rat, blood smears from filaria and malaria occupy one week, with lectures on protozoan immunity and chemotherapy; rabies with diagnostic smears showing Negri bodies is studied in conjunction with a lecture on the subject and demonstration of the action of fixed virus and the preparation of cords for treatment. The tissues of scarlet fever and small-pox with their cell inclusions are studied in conjunction with a lecture on vaccination against small-pox. The practical aspects are reinforced by a second visit to the Cutter Laboratory to observe the methods of preparing vaccine virus.

The last two lectures cover first the diseases of unknown etiology that have been experimentally studied: typhus fever, anterior poliomyelitis, yellow fever, and measles, and last a lecture on the experimental work on cancer. For the last week the student is working with unknown bacterial cultures.

It is believed that a course in pathology such as has been outlined serves best to give the student a clear conception of disease as a general process and of each specific disease as a clearly defined and continuous entity. The method enables him to study the sequence of events as they naturally occur and avoids the suspension of interest that is attendant on courses of bacteriology and morbid anatomy given separately. An attempt is made to deal adequately with functional pathology not only as the logical transition from cause to effect but as a field of greater intellectual and practical importance than either of them.

The actual success of this correlated method of teaching pathology is due largely to the constant suggestion and co-operation of my associates Drs. J. G. Fitzgerald and G. Y. Rusk.

[1] Our thanks are due to Dr. W. A. Sawyer, Director of the State Hygienic Laboratory for these and many other preparations of diagnostic value, particularly in connection with the diagnosis and treatment of rabies, willingly placed at the disposition of our students.

RICHARD BRIGHT'S TRAVELS IN LOWER HUNGARY: A PHYSICIAN'S HOLIDAY.*

By FIELDING H. GARRISON, M. D.,

Assistant Librarian, Army Medical Library, Washington, D. C.

The travels of great physicians have seldom been anything more than matters of casual record, and rarely has a professional man left a detailed account of his journeyings among strange lands and people. We have only a hint or so of Galen's wanderings or of the way in which Dioscorides worked up the data for the first treatise on materia medica while plying his avocations as an army surgeon. Aubrey affords a glimpse of Harvey in Germany, "making observations of strange trees and plants and sometimes like to be lost," and Harvey's own description of his visit to the Bass Rock stands apart as a remarkable bit of impressionistic writing, a sort of Whistlerian "arrangement in white," leaving, even for those who have never seen it, a definite presentment in the mind's eye of the gleaming chalk-white cliffs, coated with crumbled birds' eggs, the myriads of sea-birds and solan geese, whirling and screaming in the June sunlight around the huge rocky pile off the eastern coast of Scotland. In his memorial of Robert Graves, Stokes has left a fascinating account of his colleague's youthful adventures on the continent, his imprisonment as a German spy on account of his suspicious fluency in speaking the language, how he and Turner (the artist) knocked about together for months without asking each other's names, and how, during a storm in the Mediterranean, the high-spirited Graves successfully put down a mutiny on board ship, smashing the life-boat with an axe, overpowering the panic-stricken captain, assuming command over the crew, repairing the pumps with leather from his own boots and successfully bringing the vessel safely into port through his competent seamanship. The Italian travels of John Bell have a special artistic interest; Sir William Wilde's books are eminently readable, and there is interesting matter in the collected letters of Sir Charles Bell, Helmholtz, Billroth and others, not to mention the scathing arraignment of the

* Paper read before the Johns Hopkins Hospital Historical Club, February 12, 1912.

inconveniences and disagreements of Italian travel in the eighteenth century by William Sharpe, one of Bright's predecessors at Guy's Hospital.

But on the whole, it is perhaps not too much to say that Richard Bright's account of his journey from Vienna through Lower Hungary is the most important book of travels written by a physician, for his object in writing it was no less than to give, incidentally, a scientific account of the state of that kingdom at the time of the Peace Congress of 1814-15, just before the close of the Napoleonic wars. The acknowledged master in the special field in which Bright made essay is Sir Richard Burton, and, always excepting the "Pilgrimage" and the African travels, Bright's book, although of an earlier period, will compare favorably with any of Burton's in descriptive talent and scientific accuracy. Like Harvey or Sydenham or Jenner, Bright was the typical Saxon physician and his mind was of a cheerful cast. Humor he had, of the clear-eyed kind which sees things as they are and takes them as they come, but hardly the peculiar twist of phrase which marks the professional or non-professional humorist. There was in his composition not a trace of self-consciousness or whimsicality, nothing of the Celtic habit of saying something funny for its own sake or of that eminently Scotch trait of drawing out other people's peculiarities for private amusement or future reference which Joanna Baillie noted in William Hunter, and which made even his old teacher Smellie somewhat afraid of him.

Few men have entered the medical profession with such a thorough scientific equipment as did young Richard Bright. The son of a Bristol banker, his early years were exempt from struggle and it is not the least interesting trait of his honorable youth that he must have spent it in some hard and exacting study and work. When Sir George Mackenzie visited Iceland in 1810 he asked Bright, then a medical student of twenty-one at Edinburgh, and Dr. (afterwards Sir Henry) Holland to accompany him as experts, "knowing them to be young men of very superior talents and acquirements, in a high degree pleasing in their manners and promising me the hope of numbering them (as I now have the happiness of doing) among my friends." In the volume of travels which resulted from this trip, we find Bright contributing the chapters on the zoology and botany of Iceland, while Holland deals with its literature and institutions and the diseases of its inhabitants. This book is a large quarto volume of the keepsake order, handsome in typography and illustration, published by Constable of Edinburgh, who afterwards printed Bright's Hungarian travels in the same sumptuous style. The author constantly refers to Bright as an ideally cheerful companion who put up with all the hardships and mishaps of the trip with good humor and equanimity. One little contretemps is amusing enough to note in passing. While stopping as guests of Count Trampe, the former governor, the travellers were waited upon at the table by the governor's niece and "an elderly female who had appeared at the same time" and who turned out to be his sister-in-law. "We sent some trifling present to these ladies; and on this account, as soon as we entered the house, it became necessary to submit to the customary salute denoting the gratitude of those who receive presents. On many occasions we could well have dispensed with the ceremony; and our talents were often exercised in contriving means of evasion or escape." More than once, throughout this Icelandic itinerary, we have the diverting spectacle of three able-bodied, hard-headed young men at infinite pains to dodge the country schoolboy's nightmare of being "honey-fugled with a righteous kiss."

In the year 1841 Dr. Bright, then a young man of twenty-five, sometime an interne at Guy's and a recent graduate from Edinburgh, took a long vacation tour on the continent, incidentally attending lectures and clinics at Berlin and Vienna. In the winter of 1814-15 we find him back in London again, studying skin diseases at Bateman's clinics, a subject in which he and Addison always had a keen interest. In March and April, 1815 he made his two journeys into Hungary, returning home through Belgium, shortly after the battle of Waterloo, where he saw many interesting cases. The result of his continental travels was a large quarto published by Constable in 1818, with interesting illustrations all the work of his own pencil, ten of them engraved by different hands, the rest clever wood-cuts. His narrative begins with two chapters descriptive of Vienna, whither he had come to see the Peace Congress then in session. He arrived there toward the end of November, and his first lodging was "a busy and dirty inn in the commercial part of the city, which was much frequented by Greeks, Armenians and Eastern merchants." His apartment he describes as "large and desolate, without a carpet, but provided with an earthen stove in one corner, and a little wooden bedstead in the other. Such are the miserable accommodations in most of the inns at Vienna." He immediately set forth on a tour of investigation, finding the narrow streets, on a level with the carriage ways, so risky of access that "the foot passenger has no safety but in the judgment of the charioteer, who frequently risks an encounter with your feet, rather than with the wheels of a passing carriage. The coachmen, however, give some warning of their approach, by a species of unintelligible roar, a little in accent like the language in which a Lancashire carter converses with his team; but not less peremptory than the rapid 'by your leave' of a Bath chairman." Returning at an early hour he goes on, "I retired to the box, for it deserves no better name, which was destined to receive my weary limbs." Next morning he was awakened by a succession of visitors, characteristic of the Vienna of those days, a chiropodist, barber, female tooth-brush vender, and two turbaned sellers of meerschaum pipes; having disposed of these, he settled down to a breakfast "consisting, as is usual in Germany, of a jug of hot scalded milk and another of coffee." It is Sunday, a day of festivity as well as of piety in Vienna, and he is advised to go to the *Redoute* in order to see the exalted personages of the congress. Entering the Hofburg he finds himself in a brilliantly lighted salon of splendid dimensions, and we are now in the full swing of his narrative.

Never was an assembly less ceremonious; every one wore his hat; many, till the room became heated, their great-coats; and no one pretended to appear in an evening dress, except a few Englishmen. . . . Around the whole circumference of the room

were four or five rows of benches, occupied, for the most part, by well-dressed females; while the other parts presented a moving multitude, many of whom were in masks, or in dominos, and were busily engaged in talking and laughing, or dancing to the music of a powerful orchestra. My companion squeezed my arm, as we passed a thin figure with sallow shrunken features, of mild expression, with a neck stiff, bending a little forwards and walking badly. "That is our Emporor." I shook my head and smiled. . . . "There, do you see that little man with white hair, a pale face, and aquiline nose? He was almost pushed down as he passed the corner. That is the King of Denmark." Again I shook my head in disbelief. "Here the Emperor of Russia approaches." I looked up, and found the information true. His fine, manly form, his round and smiling countenance, and his neat morning dress were not to be mistaken; they were the same which, some months before, I had seen enter the church at Harlem, to the thundering peals of the grand organ. I soon recognized the tall form, the solemn and grave features of the King of Prussia. . . . "That was the Grand Duke of Baden," said my monitor, "whose toe you trod upon. . . . See, three women in masks have beset the King of Prussia; he seems not a little puzzled what he shall do with them. . . ." "Who is this young man next to us, marked with the small-pox, who is speaking broken English?" "It is the Crown Prince of Bavaria; he is said to be very fond of your nation. . . ." After a little more pushing, for the room was now becoming very full, we encountered a fine, dark, military-looking man, not in uniform, of course, but with moustaches. This was Beauharnois, viceroy of Italy.

Returning home at a late hour in the morning Bright succeeded in changing his lodging and went on with his round of sightseeing. In the grand square in front of the Hofburg he heard the sentinels announce the approach of royalty by "a yell more hideous than ever issued from the mouth of a Cherokee Indian," set off by a flourish of rolling drums. At the Carrousel he saw the splendid tournaments "contrived to dissipate the ennui of royalty" by the nobility, which consisted in riding full tilt at dummy Turk's heads (a natural object of Viennese aversion) and sweeping them off, one after another, by successive saber-strokes. Of the gorgeous uniforms of the participants he observes that "they bore the appearance of being the substantial fruits rather than the honorable testimonials of victorious arms"; and he notes that the congress was, in general, disappointing, since its splendor was entirely that of the Austrian Court, with little display on the part of the foreign visitors. He describes the Viennese picnics, tableaux, charades, dinner parties, the street scenes in Old Vienna, the crowds in the Prater, the religious ceremonials, the theaters and the innumerable court balls, concerning which one of the participants formulated an epigram which sounds like a premonition of the Old Guard at Waterloo: *le congrès danse, mais il n'avance pas.*

During his stay in Vienna Bright paid a special visit to Schönbrunn, where Marie Louise was then living in seclusion; he was taken in to see her infant son, and this is his impression of *l'Aiglon:*

He was the sweetest child I ever beheld; his complexion light, with fine, white silky hair falling in curls upon his neck. He was dressed in the embroidered uniform of a hussar, and seemed to pay little attention to us as we entered, continuing to arrange the dishes in his little kitchen. I believe he was the least embarrassed of the party. He was rather too old to allow of loud praises of his beauty, and rather too young to enter into conversation. His appearance was so engaging, that I longed to take him into my arms, yet his situation forbade such familiarity. Under these circumstances, we contrived a few trifling questions, to which he gave such arch and bashful answers as we have all often received from children of his age, and, after a few minutes conversation with Madame Montesquieu, we withdrew.

At the time of Bright's visit the Old Vienna School—Van Swieten, Auenbrugger, Stoll, de Haen—had long since passed away, and the members of the New Vienna School—Semmelweis, Hyrtl, Hebra, Skoda, Rokitansky—were either unborn, in their infancy, or in their teens. The sole survivor of the Old Vienna School was Johann Peter Frank (1745-1821), who, at time of Bright's visit, was the leading medical man of Vienna and in our own time enjoys the distinction of being the first physician to emphasize the importance of diseases of the spinal cord, while his "Complete System of Medical Polity" (*System einer vollständigen medicinischen Polizei*) is, if we except the thirteenth and fifteenth chapters of the Book of Leviticus, the true foundation of public hygiene. This remarkable work, which contains in theoretical solution all those hygienic problems which are words of ambition to-day, such as the medical inspection of schools, proper food and suitable benches for the school children, even the taxing of bachelors, was published as far back as 1777 by Schwann of Mannheim, the printer of Schiller's "Robbers." Its author, a rare and happy combination of French intelligence and German thoroughness, made his way up from obscurity to become one of the great figures of German medicine by his own unaided industry. As with Schiller, his early life was the scene of privation, struggle and parental harshness—

Der Sorge Wohnsitz die den blonden Knaben
Früh lehrte, wie man duldet, kämpft, entbehrt—

but Bright gives us a pleasing glimpse of a kindly old gentleman at ease, and at peace with himself in the evening of his life, receiving the unknown English youth with consideration and urbanity. "He is a man of the most instructive and pleasing conversation, with great knowledge both of books and men, and is most universally respected. He is now above seventy years of age, is perfectly firm and upright, and, in all his faculties and dispositions, possesses the force and energy of youth, tempered by the mildness of advancing years."

The general state of science in Vienna Bright describes as far from flourishing, by reason of the difficulties and obstacles placed in the way of education, the narrow-minded censorship of the press and of foreign publications and the relatively small number of scientific men. Besides Frank, the most notable of these were Hildenbrand, memorable for his early work on typhoid fever (1810), the ophthalmologist Beer, Vincenz von Kern the surgeon, who revived the cold water bandages of Cesare Magati (1616) as a simple treatment for wounds, and the anatomist Prochaska, whose studious secrecy and mercenary disposition in regard to a certain method of injecting anatomical preparations are duly deplored by our author.

Prochaska is ready, for fifty ducats, to supply to the curious small cabinets, accompanied with a microscope, and containing

about seventy microscopic specimens, showing the most minute ramifications of different vessels in the various structures of the body. It appears that this art of subtle injection is the same which Lieberkühn employed before them, and which was lost after his death. It would, indeed, be a blot upon the scientific spirit of the university of Vienna, if a second time such a discovery should be suffered to perish.

Of Hildenbrand Bright says:

This very able physician is the worthy successor of the celebrated Stoll and Frank; he devotes himself very assiduously to the improvement of the students, whose education, in the practical parts of medicine, he superintends. He visits the patients, in company with the pupils, as early as seven o'clock in the morning, and afterwards delivers a very excellent course of medical lectures in Latin.

De Carro, who was educated in England, at least deserves remembrance as the pioneer of Jennerian vaccination, both in Europe and in Asia, beginning his experiments, like Benjamin Waterhouse, upon his own children (1799). Count Harrack is praised by Bright for a variety of philanthropy which, except in the case of Émile Littré, is not on record as an exclusive feature of medical practice.

This singular man turned his attention to the study of medicine somewhat late in life, for the sole purpose of doing good, and continues to spend his time unceasingly in relieving the miseries of those who are unable to make pecuniary return for the attentions and advice they receive. This species of benevolent exertion is much needed in Vienna, where there are none of the smaller medical charities and dispensaries, which abound in our own country.

It appears that Count Harrack even attempted to memorialize the Peace Congress to induce the Sublime Porte to set aside religious prejudice in checking the ravages of plague in Turkey, but, very naturally the project fell through, and as Bright quaintly observes, "the followers of Mahomet still continue to view the plague with superstitious resignation."

Before leaving Vienna we may note Bright's description of the famous *Narrenthurm*, or "Lunatic's Tower," erected in 1784, one of the show places of Old Vienna, where, as in ancient Bedlam, the public were allowed to view the insane, like animals in a menagerie, on payment of a small fee.

The Asylum for the Insane is a fanciful edifice, and not well contrived. Externally, it appears a large round tower; and, on entering, it is found to consist of a hollow circle, in the center of which a square building rises, joined to the circle by each of its angles. The circular part contains the patients, and the inclosed building is intended for the residence of the keepers and the surgeon. This building is four stories high, besides the ground floor . . . . It contains 300 patients, whose condition is far from being as comfortable as in many of the establishments for the insane which I have visited.

In March, 1815, Bright, amply provided with letters of introduction to Hungarian nobles, set out from Vienna for Pressburg, journeying eastward through the flat, open country along the right bank of the Danube, and finding little of interest until he arrived at the estate of a hospitable magnate who bore the name of Count Hunyadi. The Graf, as Bright styles him, was away from home, but the director of the estate soon assured the traveller that it was an essential part of Hungarian hospitality to receive an honored guest with the same ceremony as if the master were present. Here he remained for several days and then proceeded to the silver mines of Schemnitz, in the Carpathian Mountains, and thence to Buda Pest, returning westward to Vienna by way of Raab. His second trip, in April, 1815, was another circular tour, southward from Vienna to the Balaton Lake, passing along the borders of Croatia to Fünfkirchen, then northward again to Buda Pest, returning eastward through Styria. In this way he saw the fringe of the Puszta, but did not get across the Danube into Transylvania.

In such an extensive itinerary, occupying some six hundred pages, we can best appreciate Bright's narrative by considering the things which excited his greatest interest. First of all, the people. Of Bright's very human descriptions of the Hungarian nobles and their vassals, we may say, as George Moore said of Turgenieff, that he judged both gentleman and peasant "as a scholar and a philosopher, without small-beer cynicism or that air of which Thackeray could never divest himself, of having been in society after the success of one of his books." His artistic eye delights in minute notations of the differences in female costume—Hungarian, Sclavonian, Styrian, Wallachian, Illyrian—and he devotes page after page to an endeavor to make the reader understand the almost medieval status of the Hungarian peasant at the beginning of the nineteenth century. His conclusion is that "it is not only in appearance, but in reality, oppressive. The appearance of oppression constantly imposing on the sufferer a consciousness of his humiliation, is of itself an evil hard to bear," but, even if the master were kind, the harsh condition imposed by the government itself, the heavy tolls and tributes, the quartering of troops, the constant labors required in road-making, bridge-building and other public works, made it impossible at this time for the peasant to reap any just reward for his labors.

It is certain that the whole system is bad. . . . A man of capital can bear, for a year or two years, the failure of his crops; but, let a cold east wind blow for one night—let a hailstorm descend—or let a river overflow its banks—and the peasant, who has nothing but his field, starves or becomes a burthen to his lord.

Of the peasants themselves he says:

They were cheerful—but it was the cheerfulness of boys under the eye of their master—and there was something disagreeable in that appearance of timorous, yet rebellious, subordination, which seemed to say—"This is hard—but it must be so. . . ." No one can remain long in Hungary, without seeing that all who are in stations superior to the peasant look on him with contempt, mingled with suspicion and dread.

In regard to one detail of Hungarian feudalism, a survival of the ancient Jus Gladii, or right of the lord to inflict capital punishment or imprisonment upon his serfs, our author rises almost to indignation, held in restraint by the fact that he was speaking of his hospitable hosts.

The traveller seldom approaches the house of a Hungarian noble, who possesses the Jus Gladii, without being shocked by the clanking of chains, and the exhibition of these objects of misery loaded with irons. The prison itself is never concealed from the curiosity of strangers; I should almost say that it is considered a boast—a kind of badge of the power which the lord possesses. . . . It is scarcely credible, that men of the noblest and most refined minds, should persist in the barbarous custom of placing in the

very gateway of their hospitable mansions—in the only path by which their offspring can approach the domestic hearth—the miserable victims of a most sacred, but, at the same time, most painful and revolting duty.

Bright differentiates clearly between the Slavic (Slovak) and Hungarian peasant, and in respect of neatness and cleanliness, very much to the advantage of the latter. Of the Sclavonian peasants he says:

When you have seen one you have seen all. From the same little head, covered with oil, falls the same matted long black hair, negligently plaited or tied in knots; and over the same dirty jackets and trousers, is wrapped on each a cloak of coarse woolen cloth, or sheep-skin still retaining its wool. Whether it be winter or summer, week-day or sabbath, the Sclavonian of this district never lays aside his cloak, or is seen but in heavy boots.

Add to this the fact that many were afflicted

with that unseemly disease, known by the name of Plica Polonica, in which the hair grows so matted that it is impossible to disentangle it, and becomes actually felted into balls, which, from an unfounded apprehension of bad consequences, the peasants are very unwilling to have removed. . . . The real Hungarians showed far greater attention to personal neatness, and like the gypsies, were often dressed in hussar jackets, blue pantaloons, boots and broad-brimmed hats, which gave them the appearance of banditti.

This appearance often merged into reality in the open country, through their characteristic love of indolence and the passion for wild life and freedom. As in old days on the Scotch border, "the herdsmen are usually mere thieves, stealing cattle when they are able." Bright found the Hungarian gypsies singularly like those at home, not only in appearance but in language. He made an extensive vocabulary of gypsy words, and, when he got back to England, one of the first things he did was to look up a family of hedge-gypsies at Norwood, to find to his delight that they recognized almost every word he could recall. Like George Borrow, he speaks with lively sympathy of the advantages of the free, independent roaming life of these people in the open air.

I leave it to those who have been accustomed to visit the habitations of the poor in the metropolis, in great cities, in country towns, or in any but those Arcadian cottages which exist only in the fancy of the poet, to draw a comparison between the activity, the free condition, and the pure air enjoyed by the gypsy, and the idleness, the debauchery, and the filth in which a large part of the poorer classes are enveloped.

Bright was an early advocate of the view that the gypsies, Tzigani or Egyptians, were originally a nomadic Hindu tribe, and, in support of this contention, he cites an interesting verse from old Skelton, descriptive of the Oriental turban worn by Elynoure Rumminge:

Her kirtell Bristowe red,
With clothes upon her heade,
That they way a sowe of leade,
Wrythen in a wonder wise,
After the Sarazins gise,
With a whim wham
Knit with a trim tram
Upon her brayne panne,
Like an EGYPTIAN
Capped about
When she goeth oute, &c.

In seeking contact with the Hungarian peasants and gypsies, Bright naturally found opportunities to see their national dances and hear their music, and he describes a concert which was improvised in his honor at a gipsy farmhouse, as follows:

A Cygany woman sat upon the projecting part of the heated stove, and spun with a distaff while the children crowded behind her. The four musicians arranged themselves in a circle, and a few peasants who entered, made up the party within doors. . . . The instruments were three violins and a violoncello, and, at my request, the tunes they played were the national airs of the Hungarians and Sclavonians. After listening for an hour, I was not sorry to bring the concert to a conclusion; for in truth the room, with its low boarded roof, was but little calculated for such a powerful band.

In the theaters at Buda Pest, Bright was especially attracted by the musical instruments, one of which, a set of strings struck by a plectrum, resembled the *Langspiel* which he saw in Iceland. Another was the *Dudelsack*, or Hungarian bagpipe; and a third, the cymbalom, or *Glockenspiel*, which he thought of Turkish origin.

A subject in which Bright took a curious interest was the burial of the dead. Of a deeply religious nature himself, he seems to have regarded the emotions displayed at funerals as a test of sincerity, and he attended several, he says "as a ceremony which no one ought to neglect in a foreign country." One of the finest traits of old-fashioned German character is (or was) the deep reverence and regard of children for their parents. Of this, he gives a touching example:

When I was at Berlin, during the preceding year, I followed the celebrated Iffland to the grave. Mingled with some pomp, you might trace much real feeling. In the midst of the ceremony my attention was attracted by a young woman, who stood near a mound of earth newly covered with turf, which she anxiously protected from the feet of the pressing crowd. It was the tomb of her parent; and the figure of this affectionate daughter presented a monument more striking than the most costly work of art.

The following may be taken as an expression of his views on the subject of religion:

These humble peasants of Hungary have, through the native promptings of the heart, so blended the memory of their departed friends with the feelings of devotion, that nations boasting of higher degrees of cultivation may respect and follow their example. We may civilize and refine away our feelings till the simple dictates of nature are completely yielded up. With the majority of mankind consolation is sought in forgetfulness. . . . If, putting aside all unintelligible motives, there is one which can be felt and explained, more pure than others, leading us to rejoice in our future prospects, it is the idea and hope of meeting again the friends from whom we have been separated by death.

On the road Bright's journey through Hungary was, in a sense, "roughing it." He usually travelled in a rough peasant's wagon, the wheels of his conveyance sinking "to their naves" in the mud of the boggy roads, encountering languages, as Henry James puts it, "perceived to be foreign but not further identified," so that his conversation with the toll-gate keepers and other roadside officials was, of necessity, in Latin. It was often impossible to get transportation or change of horses without a special order, and sometimes the postillion would unload him at an impossible inn, with fair promises of the best accom-

modation, and, while he was inside, would seize the occasion by the forelock and beat a hasty retreat. The fear of banditti was another excuse for shilly-shallying, and, on one occasion, when "a very exorbitant and unmanageable postmaster" gave this as a reason for avoiding the main road and taking a circuitous route, "the matter was settled, and all the banditti put to flight, by my agreeing to his terms, and paying a heavy extra charge." At the roadside hostelries, his sensations were scarcely those of the idealized eighteenth-century traveller, who,

> Where'er his stages may have been,
> May sigh to think he still has found
> His warmest welcome at an inn.

He had what were the common experiences of travellers in Eastern Europe at that time.

The most interesting feature of Bright's visit to Buda Pest is his account of the medical institutions. At this time, the University was frequented mainly by Hungarians and Transylvanians, young men who, in earlier days, sought an education in Germany or Italy. The lectures were delivered in Latin, and it is of interest to note, in this connection, that while Cullen, about the middle of the eighteenth century, had already begun to lecture on medicine in English, it was not until the advent of Schönlein at Berlin, in 1840, and of Frerichs at Breslau in 1851, that medical lectures were delivered in German. The medical course at Buda Pest extended over five years, and is outlined by Bright as follows:

First year.—Anatomy, chemistry, botany, natural history, general pathology, and surgery.

Second year.—Physiology, more minute anatomy, the theory of operations, surgical instruments, and midwifery.

Third year.—Pathology, materia medica, and diseases of the eye.

Fourth year.—Therapia of acute and chronic diseases, with clinical lectures both in medicine and surgery; and lastly, the veterinary art, which, however, may be postponed till the fifth year, or till the course is completed, but must be pursued before a diploma can be granted.

Fifth year.—The particular therapia and the clinical studies are continued, to which are added, medical jurisprudence and medical police.

The University Hospital at Buda Pest consisted of several wards of six beds each, one each for medical, surgical, and gynecological cases, one for diseases of the eye, one for lying-in women and one for syphilis. Another ward was wisely set apart for the instruction of young surgeons in internal medicine. The fourth and fifth year students attended the patients in the different wards, and each was required to report his cases in Latin and to make a separate monthly report of everything he had seen. One special duty of the pupils was to keep "a thermometrical and barometrical register," and these studies in medical meteorology, a distant reflex of the influence of Sydenham, were regularly checked up from observations made by the professor of astronomy.

He goes on:

I was much pleased with the order and regularity with which this hospital is conducted, and am not sure that more celebrated institutions might not gather hints from the proceedings of this distant and almost unknown medical school. It must, however, be owned that the whole is more manageable from its small extent, as there were not above eleven students in their fourth and fifth years, nor above thirty in the earlier years of their medical studies.

With the exception of Kitaibel, who showed Bright through the hospital, there were no medical men of consequence in Buda Pest at this time. But Hungary has given to medicine some unique names; first and foremost, the noble, self-sacrificing Semmelweis; the almost forgotten Stephan Weszpremi, whose *Tentamen de inoculanda peste*, published in London in 1755, outlined a plan of preventive inoculations against the plague; Hyrtl, the anatomist and Mikulicz, who described a new form of disease (simultaneous inflammation of the parotid and lachrymal glands) and was one of Billroth's most brilliant pupils; and, in more recent times, Robert Barany, who, only the other day, in his clinic at Vienna, went far towards clearing up the hazy subject of Menière's disease by showing, through successful operations on the internal ear, that the rotary movements, nausea and dizziness obtained by having a patient point at an object with eyes shut after previously touching it constitute a true index of labyrinthine affection (vestibular nystagmus).

While in Buda Pest, Bright paid several visits to the public warm baths of the city, many of which, he says, were "very ancient buildings, some supposed to be of Roman, others of Turkish construction." His impressions of the public baths, evidently frequented by those in the lower walks of life, may be summed up in the early Victorian epithet—Shocking! The interest of his very realistic description is that it tallies exactly with what we see in the pictures of the sixteenth century artists, Lucas Cranach, Hans Sebald Beham, Aldegrever, Hans Bock and the rest of the German *Kleinmeister*.

On entering from the open air, the room, filled with steam, was so insufferably hot, as almost to oblige us to retire. In addition to this, it appeared dark; but in a few moments both our bodies and eyes became accustomed to their new situation. The apartment was spacious, the center being occupied by a circular basin under a dome supported by pillars. The descent into this is by two steps ranging round the whole of its circumference. Here we beheld ten or twenty persons of each sex, partially covered with linen drawers and the long tresses which fell loosely from their heads, amusing themselves by splashing in the hot sulphurous water. Disgusting as this was, it formed the least disagreeable part of the scene. On the outside of the pillars, the floor was paved, and there lay, at full length, numerous human creatures, indulging, amidst the fumes, a kind of lethargic slumber; others lay upon the steps, and submitted to the kneading practiced upon them by old women employed for the purpose; some, as if resting from their labors, lay stretched upon benches; and in different corners were groups of naked families, enjoying their mid-day meal, sour crout and sausages, amidst all the luxury of a profuse perspiration. To complete the scene, there was a row of half-naked figures, like those in the bath, on whom a poor miserable surgeon was practicing the operations of cupping and scarification, studiously inflicting wounds, and making as much show of blood as possible, in order to satisfy the immoderate appetite of the Hungarian peasant for this species of medical treatment. With such a mixture of disgusting objects it never before happened to me to meet, and, almost faint with heat, I was glad to make my escape; yet my curiosity led me to several others; but in none was the construction of the chamber so

picturesque. The enjoyments of the baths, however, were the same.

Even as a youth of five and twenty Bright was a man of extraordinary thoroughness, with an almost Germanic passion for classification and tabulation, and his mind saw everything in categories. One instance of this will suffice, his synopsis of the course of instruction for women at the Georgicon or public school on the estate of Count Festetits—a relic of pre-suffragette days which bears the superscription:

OBJECTS OF FEMALE INDUSTRY.

In the first year. 1. Plain and ornamented knitting, the commencement of the sampler. 2. Hemming and seaming, quilt stitch, overcasting, and Hungarian sewing. 3. Music. In this year the pupils are expected to produce a pattern piece of knitting, a sampler, a plain knit stocking, a child's cap, and a shirt.

In the second year. 1. Continuation of the samplers, knitting a common frock for a child, and an open-work cap; together with clothing and gloves. 2. Sewing a pillowcase with buttonholes, sewing a shirt and a pair of drawers and a fine shirt with frills. 3. Spinning on the wheel. 4. Care of silk-worms and the winding of silk. 5. Music.

In the third year. 1. Fine stockings with clocks; lace-making; a lace cap and a purse; knitting a woman's cap. 2. Sewing a great coat with lace; sewing women's clothes and corsets; cutting out and practice in making up caps. 3. Washing, plaiting and ironing. 4. Drawing, as connected with female work. 5. Cooking, and other economical employment. 6. Music.

We will leave the scene of Bright's travels with a parting glance at the Hungarian enjoying his lazy gypsy life in the sunshine:

If any thing could show a want of reason, or of domestic connection and civilization, it was these groups of men, not with their families—not with their wives—not in conversation with each other—but herding together, merely because the same sloping bank invited each of them to the enjoyment of basking in the sunbeams. There they might be counted by tens, stretched out at length, wrapped in greasy sheep skins, and dreading the trouble of entering the church, where the priest had already begun to read the prayers. Arriving upon the borders of a forest, my companion quitted me, and I proceeded alone. The day was delightful; the forest was chiefly birch; the flowers were richly spread upon the ground; and I was surrounded by blackbirds and nightingales in full song. I saw two or three fine green, and several grey lizards, enjoying themselves in the warmth of the sun.

It has been a matter of comment that this Hungarian journey was of immense value to Bright in after life, in that the experience increased his faculty of vision and sharpened his powers of observation, while in the record itself he had already perfected his gift of literary expression. The style, at times a little ornate and stilted to moderns perhaps, yet still, as Lowell said of Washington, "the habitual full-dress of his well-bred mind," is a remarkable achievement for a young man of twenty-five.

The illustrations in Bright's book, his own handiwork, will go far to show that his genius as a clinician was of a piece with this priceless artistic faculty. Long afterwards, at Guy's Hospital, Wilks observed that "Bright could not theorize, but he could see." Stevenson once said of a prospective traveller: "Tell him it is the mark of a parochial gentleman who has never traveled, to find all wrong in a foreign land. . . . Let him resist the fatal British tendency to communicate his dissatisfaction with a country to the inhabitants. 'Tis a good idea, but it somehow fails to please." These random notes will have failed of their object if they presented Bright as other than an ideal traveller in this respect. It is true he grumbles a little more here and there about his indifferent lodgings, as most of us would, and his ethical sense is aroused by the sorrows of the peasantry; but the hardest things he has to say are usually about his own country, and the extension of his sympathy to objects so remote has all the attractive self-surrender of youth. He puts up with the boggy roads, the squalid hovels, the wretched accommodations, the ignorance and indifference of the natives with supreme good temper and that Saxon strain of humor which consists in mantaining an attitude of extreme gravity or self-possession in the face of almost any queer thing that may happen. Even as a young man, Bright never steps out of his dignified rôle to be consciously humorous, but a few sentences here and there may show his manner of dealing with a humorous situation. Passing through the Hungarian countryside, he observes that "Nature had done much in forming a strong race of men, however deficient the cattle may be in beauty or size"; and, in another place "As the carriage passed, the men bowed respectfully; the salutation of the women was less discernible." It was his ambition to write a special chapter on the Hungarian literature, but he soon found, for Hungary (as for our own country) in the year 1815, that as the March-Hare said to Alice in Wonderland, "There isn't any."

Bright paid another visit to the continent in 1818, spending some time in Germany, Switzerland, Italy and France, but his time for writing travels was over and he was now settling down to the serious business of his life. He commenced private practice in 1820, after passing through an almost fatal attack of fever in connection with his duties as assistant physician at the London Fever Hospital, and in the same year he accepted a similar post at Guy's Hospital. He became an F. R. S. in 1821 and in 1824 was appointed full physician at Guy's, Addison having been made assistant physician at the same time. Three years later he published the work which was to make his name famous all over Europe, the first of the two splendid volumes of "Reports of Medical Cases" (1827), elaborately illustrated with full-page plates from water-color drawings, and, apart from its scientific interest, a unique monument of that sportsmanlike devotion to their profession which so many physicians have shown in a field of literary venture which is costly but never remunerative. In 1832 Hodgkin published his original paper "On Some Morbid Appearances of the Absorbent Glands and Spleen";[1] and in 1855 Addison's book "On the Constitutional and Local Effects of Disease of the Supra-renal Capsules" appeared, his preliminary communication on the subject having been read before the South London Medical Society in 1849.[2] Bright's disease, the original correlation of inflammation of the kidneys with dropsy and

[1] Med. Chir. Tr., Lond., 1832, XVII, 68-114.
[2] Lond. M. Gaz., 1849, XLIII, 517.

albuminuria, immediately made its fortune, as the French say, on account of its immense importance in medical practice. The discoveries of Hodgkin and Addison were slurred over as mere curiosities, and although we find Virchow reporting upon Addison's disease and upon the chemistry of the suprarenal capsules in 1857,[3] it was due to the equity and loyalty of Sir Samuel Wilks, the zealous, but not jealous, guardian of the honor of Guy's Hospital, and to the fair-minded and generous Trousseau, that these diseases were given their permanent place in modern medicine.

The remarkable original work done at Guy's Hospital is properly a subject for the pathologist and the clinician, but it may be worth while in passing to glance at these discoveries from the bibliographic angle in their historic sequence, particularly as a flood of light has been shed over the whole matter in the "Biographical Reminiscences" of the late Sir Samuel Wilks (1911). It was here that Sir Astley Cooper did some of the earliest work in experimental surgery after the time of John Hunter (1836);[4] here Addison, Golding Bird and Gull first tried the effects of static electricity in disease (1837);[5] here Pavy did his first experimental work in diabetes (1853);[6] here John Cooper Forster performed the first gastrostomies in England (1858-9);[7] and here occurred what might be regarded as an event in the history of obstetrics, the first findings of albuminous urine in cases of puerperal eclampsia by Lever in 1843,[8] the most important outcome of Bright's teaching in albuminuria. But the special achievement of the men of Guy's was in the department of original descriptions of disease.

The eighteenth century was especially rich in new descriptions of diseases, many of which, as Friedrich Hoffmann's account of rubella (1740), Watson's description of scleroderma (1754), Robert Whytt on tubercular meningitis (1768), Sœmmerring's case of achondroplasia (1791), or John Haslam's account of general paralysis (1798), have only been brought to the front in recent years. In the first quarter of the nineteenth century, we have Otto's description of hæmophilia (1803), Vieusseux's sketch of cerebro-spinal meningitis (1805), Badham's little book on bronchitis (1808), Hildenbrand on typhoid fever (1810), Bayle on phthisis (1810), Wells on rheumatism of the heart (1812), Sutton on delirium tremens (1813), Blackall and Wells on albuminuria (1814), Hodgson's book on diseases of the arteries, containing his account of dilatation of the aortic arch (1815), Parkinson on paralysis agitans (1817), Bostock on hay fever (1819), Bouillard's description of aphasia (1825), Louis on phthisis (1825), and Bretonneau on diphtheria (1826). Laënnec, in the first and second editions of his treatise on mediate auscultation (1819-23), aside from his classical pictures of bronchitis and pneumonia, described and differentiated almost every pathological occurrence inside the chest—bronchiectasis, pneumothorax, hæmorrhagic pleurisy, gangrene of the lungs, emphysema of the lungs, œsophagitis, and one form of cirrhosis of the liver. Sir Clifford Allbutt refers to "the spacious times of Bright and Addison," and there was indeed a mighty sweep to the clinical work of these two men which can only be paralleled by what Laënnec and Louis, Corvisart and Bouillaud, were doing across the channel, or in some measure by the work of Graves, Stokes and the physicians of the Irish school.

The physicians of those days had no instruments of precision except their five senses. Even as late as 1870, Wilks tells us the clinical thermometer was considered a curiosity at Guy's and Dr. Weir Mitchell points out that it was "under the influence of the great Dublin school, that the familiar figure of the doctor, watch in hand, came to be common-place."

Bright's economy of means in testing urine for albumen, only a candle and a spoon, reminds us of Virchow cutting sections all his days with an old every-day razor, or of Sharpey demonstrating kymographic tracings to his class with the aid of a rusty, well-worn beaver hat as a cylinder.

In addition to the diseases called by their names, Bright, as far back as 1833,[9] had described cases of pancreatic diabetes and pancreatic steatorrhœa, and is to be credited with early accounts of acute yellow atrophy of the liver (1836),[10] unilateral convulsions or Jacksonian epilepsy (1836),[11] and acute Hodgkin's disease or "status lymphaticus" (1838).[12]

Addison, in 1849 (London, M. Gaz., 1849, XLIII, 517), twenty years before Biermer, described acute pernicious anæmia, and in 1851 (Guy's Hosp. Rep., 1851, 2. s., VII, 265), with Sir William Gull, the skin disease known as xanthoma (vitiligoidea); and Hodgkin described aortic regurgitation in 1827 (Lond., M. Gaz., 1828-9, III, 433-443—read before Hunterian Society, February, 1827), five years before Corrigan's classical paper was published. In 1856 Sir William Gull (Guy's Hosp. Rep., 1856, 3. s., II, 143) gave perhaps the earliest account of the degenerations of the posterior columns of the spinal cord in the locomotor ataxia, and in 1873 described myxœdema (Tr. Clin. Soc. Lond., 1873-4, XII, 180-185), to which Ord gave the name in 1877 (Med. Chir. Tr., Lond., 1877-8, LXI, 57-83). Finally, Sir Samuel Wilks himself made important and elaborate studies of Bright's, Addison's and Hodgkin's diseases, to the latter of which he gave the name in 1865, described linear atrophy of the skin (lineæ atrophicæ) in 1861 (Guy's Hosp. Rep., Lond., 1861, 3. s., VII, 297-301), necrogenic (dissecting-room) warts ("verrucæ necrogenicæ") in 1862 (Ibid., 1862, 3. s., VIII, 263-265), published one of the earliest papers on visceral syphilis in 1863 (Ibid., 1863, 3. s., IX, 1-64, 4 pl.), and, in 1869, gave interesting accounts of the external manifestations of osteitis deformans (Tr. Path. Soc., Lond., 1868-9, XX, 273-277) and acromegaly (Sir S. Wilks, Biographical Reminiscences, Lond., 1911, pp. 188-189). Perhaps the most important original contribution which Wilks made to medicine was the description of alcoholic paraplegia in his lectures of 1868 (Med. Times & Gaz., 1868, II, 470), which, as Osler points out (New York Med. Jour., 1904, LXXIX, 570), "was the foundation of English teaching on the subject, and, as describing the mental symptoms, contains all that is implied in the useless eponym "Korsakoff's insanity." Even as far back as 1786 Lettsom, in what is perhaps the earliest paper on the drug habit (Mem. Med. Soc., Lond., 1779-87, I, 128-165), had already outlined the pathological effect of alcoholism. The cases of priority discussed by Wilks are of little importance in relation to the time of their publication but are of unusual interest in confirmation of well authenticated modern discoveries. In the same sense, Velasquez's dwarfs, the pictures of rhinophyma by

[3] Deutsche Klinik, Berl., 1857, 441, and Virchow's Arch., 1857, XII, 481.

[4] Guy's Hosp. Rep., Lond., 1836, I, 457, 654.

[5] Ibid., 1837, II, 493.

[6] Guy's Hosp. Rep., Lond., 1853, 2. s., VIII, 319.

[7] Ibid., 1858, 3. s., IV, 13; 1859, V, 1.

[8] Ibid., 1843, 2. s., I, 495.

[9] Med. Chir. Tr., Lond., 1833, XVIII, 1-56 (Case 1).

[10] Guy's Hosp. Rep., Lond., 1836, I, 604-637.

[11] Ibid., pp. 36-40.

[12] Guy's Hosp. Rep., 1838, III, 437.

RICHARD BRIGHT.

PORTRAIT OF BRIGHT, PAINTED BY T. R. SAY.

MARKET AT BATHS.
(Original Drawing by Bright.)

Ghirlandajo in the Louvre and by the younger Holbein in the Prado, or Lucas van Leyden's portrait of Ferdinand I. of Spain in the Uffizi, giving the "adenoid face," might be regarded as instances of priority, antecedent to Romberg, von Hebra, or Wilhelm Meyer.

In the case of Bright, as Wilks said, "we are struck with astonishment with his powers of observation, as he photographed pictures of disease for the study of posterity." In the introductory address to his classes for the year 1832, there is an often quoted sentence which is a remarkable example of his power of visualizing these things:

> By the EYE you will learn much; many diseases have the most distinct physiognomy. The sunk and shrivelled features derived from the long-continued disease of the abdominal viscera, the white and bloated countenance often attendant on changes in the functions or structure of the kidney, the sallow and puffy cheeks of the liver diseased from habitual intemperance, the squalid and mottled complexion of the cachexia dependent upon the united effects of mercury and syphilis, the pallid face of hæmorrhage, the waxen hue of amenorrhœa, the dingy whiteness of malignant disease, the vacant lassitude of fever, the purple cheek of pneumonia, the bright flush of phthisis, the contracted features and corrugated brow of tetanus—all these shades of countenance, and very many more which I might enumerate, with all their varieties of combination, are distinctly recognized by the experienced eye.[13]

Bright's associates at Guy's Hospital were, all of them, men of strong and striking personality. At this period Sir Charles Bell and Sir Benjamin Brodie, Travers, Liston and Pridgin Teale, were prominent figures, but Hodgkin and Addison were hardly ever heard of, and Bright, although he became in time the leading consultant in London, was little known outside of Guy's.[14] Ashton Key, another brilliant and able surgeon of Guy's, imposing in manner, but autocratic and quick-tempered, stalked through the wards, always wearing shepherd's plaid trousers, extending a forefinger for his dressers to shake.

Addison, a man of commanding appearance and imperious temper, was probably the ablest clinical lecturer of his time. He is described by Wilks and Bettany as

> erect, with coat buttoned up very high, over which hung his guard and eyeglass. He wore a black stock with scarcely visible shirt collar, and this further elevated his head. He had a well-proportioned, good head, with dark hair and side whiskers, large bushy eyebrows and smallish dark eyes, nose thick, as were also the lips which enclosed his firmly knit mouth. His features were not refined, but belonged to a powerful mind, and showed no trace of any kind of sentiment. His penetrating glance seemed to look through you, and his whole demeanour was that of a leader of men, enhanced by his somewhat martial attitude. It is not surprising that the students worshiped him, and feared him rather than loved him; in fact, many thought him unapproachable, and never became closely attached to him. Many a student felt aggrieved, when bidding farewell to his master, that he failed in reciprocating the pupil's painful feeling of separation.

Yet Addison's manner, at times cold, haughty, blunt or even rude, was, he himself declared, only a cloak for nervousness. "It was only to some of his nearest friends that he disclosed some of the secrets of his life, his awful fits of despondency associated with some fearful circumstances which made him wonder that he was still alive to tell the tale." Wilks gives several anecdotes of his generosity and kindness of heart, and relates that he once checked a disparaging statement about an eminent physician with whom he had severed relations, by saying abruptly, "He is my colleague." Addison was, like Skoda, a diagnostician of extraordinary ability, but he attached so little importance to treatment that he sometimes forgot to prescribe. He died June 29, 1860.

Hodgkin, a member of the Society of Friends, always wearing their characteristic dress, was intended by nature for a philanthropist and social reformer and had the touch of eccentricity which often goes with that type of character. "On one occasion," it is related, "after sitting up all night with a man of very large fortune, Dr. Hodgkin offended him by filling up a blank cheque with the sum of £10, and made the offense still greater by telling him that 'he did not look as if he could afford more.' Dr. Hodgkin was never again sent for by the gentleman. It was difficult to make Dr. Hodgkin take the fees he had earned, and for this reason alone many of his friends would not consult him." Hodgkin left Guy's in 1837, having incurred the strong dislike of the autocratic treasurer, "King" Harrison, who, says Wilks, "would have no officer of the hospital who drove about with a North American Indian." He eventually dropped out of practice and devoted the rest of his life to the cause of persecuted Hebrews, emancipation, and similar philanthropies. He died at Jaffa, April 5, 1866, while travelling in the East with Sir Moses Montefiore, who erected the monument over his grave.

Of the three, Bright, who died December 16, 1858, was by far the best-balanced, a solidly built man of medium height, with a fine Thackerayesque head, a man of remarkably firm, even, self-contained character, and of cheerful, generous and unprejudiced disposition. Yet, in the days of Wakley's antagonism to Guy's even Bright did not escape the following, in which we recognize the familiar, testy ring of professional jealousy: "Bright and Addison give medicine; but Dr. Williams of St. Thomas's is far superior; for Bright is a heavy, conceited person and Addison a blustering bundle of loquacity. He will lecture for an hour on the causes of catarrh, and the distinction between lepra and psoriasis." In similar

[13] The minor discoveries of Bright afford most interesting correlations with modern work, but he himself, so rich in knowledge and so generous towards his colleagues, would have attached the least importance to priority. In the case of those original contributions of lesser men which have become buried by the dust of time, the question of priority is of capital importance, and some of the best historical research in recent times has been employed in bringing their work into prominence again. Sir William Osler rescued the obscure name of Hezekiah Beardsley from oblivion, and, as Dr. H. A. Kelly has shown, as far back as 1759, Mestivier, a forgotten French surgeon, performed an operation for appendicitis, the subsequent findings showing that not the cæcum, but the appendix alone was inflamed, the cause being a rusty pin inside the latter. As Dr. Billings said of the pioneer American surgeons in the backwoods "*les petits prophets*, as Verneuil styles them, are worthy of all honor," and one of the objects of the history of medicine is "to keep their names at least from being forgotten."

[14] I am indebted for these facts to Dr. Robert Fletcher, of Washington, D. C., who, about the time of Bright's retirement from practice, was a student at the London Hospital, and is, in fact, its oldest living graduate.

strain, Addison is elsewhere described as "a fine, dashing, big, burly, bustling man, proud and pompous as a parish beadle in his robes of office. Dark, and of a sallow complexion, an intelligent countenance and a noble forehead, he is what the ladies would pronounce a fine man. He has mentally and physically a tall idea of himself." Addison, in the light of what has been said, needs no defense, but the phrase "a heavy, conceited person" has been sometimes cited as a sort of half-truth in connection with the name of Bright. Of the character of the man who did so much to make internal medicine worthy of being called a "science," there can be no doubt. All his contemporaries agree that truth and honor, generosity and fair play were the essence of Bright's nature, and in the record of his travels, as in the story of his life, we do not find a trace of that over-estimation of self which we call self-conceit, the hall-mark of intellectual dishonesty. His character reminds us of the truth of Emerson's aphorism that "Great men do not work for show." He was, as Wilks tells us, somewhat oblivious of the importance of his own work and incapable of anxiety about its future fortunes. But that this trait was far removed from priggishness is plain when we glance over his writings and see how he constantly delights in referring to the work of his colleagues, however obscure. In spirit he was no less than the "high-minded man" of the Nichomachean Ethics, but, at heart and in his private feelings, the old-fashioned Christian gentleman. His scientific work, like Addison's, reaches far out into the medicine of the future; and in the hundreds of pathological reports which he has so carefully recorded, it is probable that the physicians of to-morrow will find correlations as yet unthought of, an impression which the Reminiscences of Sir Samuel Wilks have amply and happily confirmed for the present time.

AUSTIN FLINT: HIS CONTRIBUTIONS TO THE ART OF PHYSICAL DIAGNOSIS AND THE STUDY OF TUBERCULOSIS.

By H. R. M. Landis, M. D., Philadelphia.

For those who take an interest in the achievements of American medicine, it cannot but be a source of pride that, of the small group of men who rounded out the work of Laennec, no apologies are needed when the name of Austin Flint is linked with that of Skoda, of Stokes and of Walshe.

We must not lose sight of the fact that Laennec's method, except by a few, was slow in being generally adopted. As late as 1856, Flint remarked, in the preface of his work on "Physical Exploration," that the method was employed by but a few physicians; many failed to practice it at all and not a few disbelieved in it altogether. Each country had its pioneer, and in this capacity if no other, American medicine owes much to Austin Flint.

Austin Flint was born in Petersham, Mass., October 20, 1812, four years before Laennec chanced on the discovery of mediate auscultation. This epoch-making discovery made possible modern clinical medicine, which was just emerging from its swaddling clothes when Flint began the study of medicine in 1832. It has been well said that the direction in which education starts a man will determine his future life; and of no man is this more true than of Austin Flint. He took up the study of medicine with a strong hereditary bias in its favor, his father, his grandfather and his great-grandfather having been physicians before him. Furthermore, fortune favored him in his choice of a school, for among his teachers were two remarkable men, Jacob Bigelow and James Jackson, who exerted a powerful influence on his life. His veneration for Laennec and his work unquestionably began in his student days, a brief glimpse of which he has left us.

"As early as 1832," he wrote, "when I attended medical lectures in Boston, James Jackson, the Professor of Medicine, then about to retire from medical teaching, was earnestly engaged in the subject of physical exploration. He never failed to carry the stethoscope during his hospital visits, and the signs of cardiac and pulmonary diseases entered largely into his clinical instructions."

Unlike many of his contemporaries, Austin Flint did not have the advantage of a European training. But so far from regretting it, he at one time advised young men against going abroad, expressing the belief that persisting industry and self-reliance would accomplish the desired results in this country. It must be confessed, however, that several of his objections were not convincing, namely, the temptations to pleasure and vice, which were to be met on every side, and the difficulty of acquiring the French tongue.

In the little more that half a century which elapsed between his graduation from the Harvard Medical School in 1833 and his death in New York on March 13, 1886, he enjoyed a peripatetic existence unusual even at a time when men not infrequently shifted from place to place. During this time, he practiced his profession or lectured in medical schools in no less than six widely separated localities.

A graphic description of the experience gained in these years has been written by his son. During his professional life he encountered "soldiers in camp and in barracks; the rich and the poor; those affected with diseases incident to lives of ease and luxury and paupers in hospitals; the pioneers of western New York and the inhabitants of the metropolis; patients in the wards of the Alms House and hospitals of Buffalo, of the Marine Hospital in Louisville, Ky., the great Charity Hospital in New Orleans, La., the Bellevue Hospital, the Charity Hos-

* Paper read at a meeting of The Laennec, A Society for the Study of Tuberculosis, The Johns Hopkins Hospital, February 26, 1912.

pital, the dispensaries and similar institutions in the City of New York; cases observed in the experience of a quarter of a century as a general practitioner, and of more than another quarter of a century as a consulting physician, including epidemics which have occurred in this country within the last fifty years." The records of these experiences, begun in 1833 and continued for more than half a century, covered sixteen thousand nine hundred and twenty-two folio pages of manuscript written with the author's own hand.

Shortly after his death, one of his most distinguished contemporaries, J. M. Da Costa, said of him: "With, perhaps, the single exception of Rush, there is no man who, in his many-sided capacities of teacher, author and investigator, has had thus far as much influence on the medicine of this country as Austin Flint." The number of students and practitioners whom he reached by his oral teachings and writings was enormous and unquestionably had much to do with the ultimate adoption of methods of physical exploration.

While a prolific writer on all phases of internal medicine, his reputation has endured largely because of his contributions to our knowledge of physical diagnosis and diseases of the heart and lungs. In this field he was preeminent, and most of his observations on the art of physical diagnosis are still authoritative.

A striking feature of his writings on physical diagnosis was the absence of theoretical speculation on the causation of signs. "The significance of signs which represent abnormal physical conditions," he observed, "rests on the uniformity of their association with the latter . . . . certain physical signs denote certain abnormal conditions, because clinical experience, inclusive of the study of lesions with the scalpel, has sufficiently established the fact."

Neither Laennec nor any of those who immediately followed him paid any attention to changes in the pitch of the percussion note or respiratory sounds. The value of pitch is now universally acknowledged and the credit for this addition to the art of physical diagnosis belongs to Austin Flint. His observations were embodied in an essay entitled, "Variations of Pitch in Percussion and Respiratory Sounds, and Their Application to Physical Diagnosis." This essay was awarded the annual prize of the American Medical Association in 1852. Our admiration for this essay cannot but be increased when we recall that the observations it records were those of one engaged in a country practice in Buffalo, then far distant from the large medical centers and little more than a frontier town.

The pathological significance of variations in the pitch of resonance, he says, may be stated in the following law: "An elevation of pitch always accompanies diminution of resonance in consequence of pulmonary consolidation. In other words, dulness of resonance is never present without the pitch being raised.

"The practical advantages to be derived from attention to pitch in employing percussion are that it confirms the existence of dulness and furnishes positiveness to the conclusion when the mere diminution of resonance might not be with certainty determinable; that it is of advantage, in some instances, when a disparity in the amount of resonance is inappreciable; and finally, it aids in developing a disparity in situations (supra- and infraspinous regions) in which but little resonance can be elicited owing to the intervention of bone, muscle and fat between the integument and walls of the chest."

In common with other observers of his time, he was familiar with the disparity of the percussion note in the infraclavicular regions, which he ascribed principally to an elevation of pitch on the right side. In one of his later contributions he described the percussion note in the right infraclavicular region as being vesiculo-tympanitic, emphasizing the fact that it was not dull but simply relatively less intense than on the left side. It is a remarkable testimony to his acuteness of sound perception that his analysis of the note produced in this situation has recently been satisfactorily explained by Drs. Norris and Fetterolf in a paper on differences in the percussion note over the two apices, read before the College of Physicians of Philadelphia. These observers have shown that the right apex is smaller than the left, being cone-shaped, while the left apex is dome-shaped; furthermore, the close proximity of the right apex to the trachea accounts for the tympanitic quality.

The great practical importance of elevation of pitch of the percussion note was, in his opinion, the aid it furnished in recognizing incipient tuberculosis when the deposit of tubercles was small in amount. "Any addition," he wrote, "to our means of giving precision to the diagnosis of incipient phthisis is a valuable consideration, not only to our science, but to our art, inasmuch as the prospect of saving or prolonging life is greater in proportion as the affection is earlier recognized."

A distinct advance also was made in our knowledge of the respiratory sounds by his study of changes of pitch. Bronchial breathing he pointed out was high in pitch, expiration being even higher than inspiration. Vesicular respiration, on the other hand, exhibits some striking points of dissimilarity. The inspiratory sound is lower in pitch, and the expiratory sound, when heard, save in a limited situation, is lower than the sound of inspiration.

Prior to his studies on pitch there was little or no attempt to differentiate cavernous from bronchial or tubular respiration. Flint pointed out that cavernous breathing was the exact opposite to bronchial respiration in that the inspiratory sound is low in pitch, non-vesicular in quality—a simple blowing sound—and the expiratory sound is still lower in pitch with the same quality.

Vesicular breathing, which is so frequently described as "breezy," "rustling," etc., never met with his approval. In his work on "Physical Exploration of the Lungs," published in 1856, he submitted the following inquiry:

"May not the peculiar quality be owing to the separation of the sides of the cells and the capillary tubes, which to a greater or less extent come into contact and, owing to the moisture of the tissues, are adherent during the collapse of the lung incident to expiration?" This conception evidently came from the explanation of the mechanism of the crepitant râle, given by Dr. E. A. Carr, of Canandaigua, N. Y., in 1842.

At another time he wrote, "It is noteworthy that Laennec,

in describing the differences between the vesicular murmur and bronchial respiration, says that the latter loses the 'slight crepitation' which belongs to the former. The expression 'slight crepitation' distinguishes more accurately than any other term the peculiar quality of the vesicular murmur, and, at the same time, it denotes the mechanism."

The term broncho-vesicular breathing, one of the most frequently used, and I might add, least understood, terms in physical diagnosis, was first described by Flint in 1852 under the name *rude* respiration. The term was introduced to embrace the abnormal variations between normal vesicular and bronchial respiration, the character of both being combined in variable proportions corresponding to the amount and extent of solidification. If the inspiratory sound has any recognizable vesicular quality, it is not bronchial but broncho-vesicular.

His description was as follows: "To form a correct idea of the modification usually termed *rude*, etc., it must be analytically decomposed, and the nature of its elements determined. It is an approximation to the bronchial respiration. It exhibits an incipient development of the character distinguishing the bronchial from the vesicular respiration. One of the most striking of these characters is the change in pitch. The pitch is raised. The vesicular quality is diminished; hence it approaches to a tubular or blowing respiration. The inspiration may be somewhat shortened and occasionally a sound of expiration becomes developed and prolonged, constituting an important rhythmical variation."

His final word on this type of respiration is as follows: "A case of pneumonia during the stage of resolution affords illustrations of all the gradations of this sign. The sign is present as soon as absorption has removed the contents of a sufficient number of air vesicles for a vesicular quality to be perceived in the sound of inspiration. The tubular quality now predominates, and the respiratory sound is still prolonged, high and tubular. With each successive day, as absorption progresses, the vesicular quality in the inspiratory sound increases, and the tubular quality diminishes. With these changes in the inspiratory sound, the expiratory sound on each successive day is less prolonged, less intense, less high in pitch and less tubular in quality. At length, resolution being complete, the vesicular quality becomes, for a time, more marked than in health, all the characters of the broncho-vesicular respiration having disappeared."

Just as under normal conditions there is a disparity in the percussion note in the infraclavicular region, so, too, does the character of the breath sounds differ, that at the summit of the right lung being broncho-vesicular in character. "Without a knowledge of these facts," he says, "it can hardly be otherwise than that an error of diagnosis will be committed, by mistaking for the physical signs of disease, the several characters of the bronchial respiration, which may exist at the summit of the right chest, not proceeding from a morbid condition. I am free to state that my own experience would supply illustrations of error from this source." Later, in 1881, in a paper on "An Analytical Study of Auscultation and Percussion," read before the International Medical Congress, he emphasized the fact that "a prolonged expiration is not a sign of phthisis unless the pitch be raised, and the quality more or less tubular."

His studies of pitch brought out changes also regarding the whispered voice. Laennec believed pectoriloquy almost pathognomonic of a cavity, and Walshe, who introduced whispering pectoriloquy, attached the same significance to this modification. Flint, however, showed that the whispered voice was also subject to variation of pitch, and that considerable diagnostic significance could be attached to these variations. Thus, in differentiating between consolidation and an excavation, the whispered voice in the former is high in pitch, tubular, and resembles bronchophony; in the latter it is low in pitch and blowing. "The differential characters thus, as is evident must be the case, correspond to those of expiration in the cavernous and the bronchial respiration," as the whisper is usually an act of expiration.

To Austin Flint must be credited the practical application of the fact that fluid in the chest cavities changes its level with alterations of the position of the patient. His observation on movable dulness in cases of pleural effusion is as follows: "Without taking pains to demonstrate the variation of the level too elaborately, which is not always convenient in practice, if the upper limit of the flatness in front be ascertained by percussion, while the trunk is in a vertical position, then cause the patient to lie down, and ascertain if the resonance does not extend an inch or more below the point at which, in the previous position, the upper limit of flatness was found to exist." (Physical Exploration of the Lungs, 1856.)

He also called attention to the fact that in cases of perforation of the stomach or intestines, liver dulness was obliterated or greatly diminished.

While he was an equally close student of the physical signs related to the heart, he did not add much of an original nature to this aspect of physical diagnosis. In 1858, he submitted an essay on variations of pitch of the heart sounds, which like its predecessor on "Variations of Pitch in Percussion and Auscultation" received the annual prize offered by the American Medical Association.

Curiously enough, his name is most frequently recalled today by reason of its being associated with the presystolic murmur which sometimes accompanies aortic regurgitation. The association of a physical sign with the name of its describer was a practice he did not approve of. "So long," he wrote, "as signs are determined from fancied analogies, and named from these or after the person who describes them, there cannot but be obscurity and confusion."

The first time he observed the so-called "Flint murmur" was in 1859, in a patient in the Charity Hospital in New Orleans, who had well-marked signs of double aortic disease and a presystolic murmur at the apex. At the autopsy, however, the mitral valves were found to be normal. The cause of this phenomenon, given in 1862 (American Journal Medical Sciences), is as follows: "The explanation involves a point connected with the physiological action of the auricular valves. Experiments show that when the ventricles are filled with a liquid, the valvular curtains are floated away from the ventricular sides,

approximating to each other and tending to closure of the auricular orifice. . . . Now in cases of considerable aortic insufficiency the left ventricle is rapidly filled with blood flowing back from the aorta, as well as from the auricle, before the auricular contraction takes place.

"The distention of the ventricle is such that the mitral curtains are brought into coaptation, and when the auricular contraction takes place the mitral direct current, passing between the curtains, throws them into vibration and gives rise to the characteristic blubbering murmur. The physical condition is in effect analogous to contraction of the mitral orifice from an adhesion of the curtains at their sides, the latter condition, as clinical observation abundantly proves, giving rise to a mitral direct murmur of a similar character."

His contributions to the study of tuberculosis are among the best, from a clinical standpoint, which our literature contains, and if he can be said to have had any special preference, it was for the study of this disease. From his earliest contribution on the subject, in 1849, he continued to be a close student of tuberculosis in all its phases, and while ever ready to accept new advances as to its etiology, he resisted strongly the various theories advanced to disprove its unity. Especially worthy of mention is the monograph on "Phthisis" published in 1875. This is a masterly analysis of over six hundred and seventy cases, and deserves to be ranked with the great work of Louis, after which, indeed, it was modeled.

Dr. Edward L. Trudeau has sketched for us the attitude of the medical profession towards tuberculosis in 1873, in the following words: "The climatic treatment was within the reach of only a small class of patients, namely, the well-to-do; and they were not generally sent away until their physician, or they themselves, became alarmed at the activity of their symptoms. The poor, and the large class of men and women who depended upon their daily work for their support, were left to their fate. No special stress was laid on the early recognition of the disease, as it was generally believed to be fatal. This, then, was approximately the attitude of the profession and the public towards tuberculosis when I went to the Adirondacks in 1873."

Probably the greatest service Austin Flint rendered to the study of tuberculosis was his insistence on the importance of recognizing the disease in its incipiency. From his earliest article on the subject in 1849, he constantly emphasized this point as being "immensely important by the fact that the prospect of exerting a control over the disease and diminishing its tendency to a fatal issue, is in proportion to its early recognition." In the essay on "Variations of Pitch, etc.," published in 1852, the most important practical deductions he made were with reference to this point.

The following cases, taken from the essay on pitch, are illustrative of what he considered incipient tuberculosis:

(1) Cough for two months and slight expectoration. Slight dulness in right infraclavicular region. Expiration prolonged and similar in pitch to inspiration with an interval between inspiration and expiration. This case was doubtful but afterwards was conclusively shown to be tuberculous.

(2) Cough, slight expectoration. Chest pain and an occasional night sweat. Slight dulness in left infraclavicular region, also posteriorly over scapula; bronchophony; pitch of respiration is in a marked degree higher on the left than the right, at the summit of the chest anteriorly and posteriorly. The elevation in pitch is the chief disparity between the two sides.

Of course, more recent studies of the breath changes in early tuberculosis have enabled us to anticipate even the stage depicted by Flint, but the fact remains that the majority of cases of early tuberculosis to-day are recognized by the signs he emphasized sixty years ago.

He was thoroughly alive to the importance of certain symptoms which mark the onset of tuberculosis, such as hemoptysis and a persistent cough. Of the former, he wrote:

"Hemoptysis occurs in some cases when not only the symptoms of pulmonary disease are wanting, but the result of physical explorations of the chest is negative." "Prudence dictates that, in the cases in which hemoptysis is the only evidence of pulmonary disease, it is wise to act as if phthisis either exists or is impending."

And again, "Another conclusion is, that hemoptysis is not a cause of phthisis, as was asserted by Niemeyer. This is a fair inference from the fact that in only about one-third of the cases in which hemoptysis occurred as an antecedent event, was it immediately followed by the evidence of pulmonary disease, an interval of weeks, months or years elapsing in two-thirds of the cases."

Of cough, he said, "I do not claim, in behalf of this symptom, that it always denotes the precise time when phthisis begins. That, as a rule or often, a persistent cough precedes the development of phthisis, I do not believe. It seems to me fair to conclude that the disease existed when such a cough began; but it is not so clear that a cough always attends the beginning of phthisis."

In view of the acrimonious discussions that have raged for years regarding the value of this or that climate, the following, written in 1875, is of interest:

"My studies seem to lead to conclusions at variance with the prevailing popular and professional belief in a special climatic influence. In the first place, it does not appear from the analysis of my cases that changes of climate have in a marked degree a beneficial influence, as compared with the hygienic measures available at home. In the second place, the improvement following a change appears to pertain alike to different climates and places. Hence, it seems a fair inference that the benefit derived from the change is due, not so much to a climatic influence, *per se*, as to the circumstances incidental to the change. These circumstances are often a change of habits from those which are sedentary and confining within doors, to those involving out-of-door life and activity, freedom from the cares, anxieties and annoyances of business at home, and, it may be added, the moral effect of the hope or expectation of being benefited by climatic influences."

His study of the natural history of disease led him to a belief that phthisis was to a certain extent self-limited and that recovery frequently occurred whether anything was done or not,

and in some instances in spite of what was done. In an analysis of seventy-five cases ending either in complete recovery or non-progression of the disease, he showed that in one-half of them there had been no treatment whatever which could be said to have brought about the favorable result.

Of another important phase of the treatment of tuberculosis he wrote: "The importance of alimentation in this disease may be measured by the significance in prognosis of appetite, digestion and nutrition. Recovery cannot take place, the disease, in fatal cases, will not be very slowly progressive, its duration prolonged, tolerance of it maintained, if the conditions of assimilation do not approximate to those of health. This statement is sustained alike by clinical experience and common sense. Hence, alimentation is an essential part of the treatment."

One of the distinguishing features of Austin Flint was the receptivity of his mind. He was ever ready to discard the old and accept the new, providing the latter bore the evidences of truth. The reproach of opposing a new advance because it was contrary to accepted belief cannot, in a single instance, be brought against him.

Shortly after Koch's paper on the etiology of tuberculosis appeared, he began having the sputum of the patients at the Bellevue Hospital examined and quickly assured himself of the importance of the discovery. In a paper read a short time afterwards (he was then in his seventy-second year), he pointed out that it was a rational supposition that the danger of contracting phthisis was probably proportionate to the degree of exposure to the contagion. "In short," he remarked, "I have applied to pulmonary phthisis well-known truths as applied to other infectious diseases. These truths are novel, and may seem startling in their application to pulmonary phthisis, because, up to the present time, few physicians have been accustomed to look upon this disease as belonging to the infectious diseases."

The extraordinary elasticity of his mind enabled him even to peer into the future. There has been scarcely an advancement made since his death that would cause him any great surprise or wonder, for that most of them would happen, he predicted in the last article he ever wrote, which was published after his death. In "Medicine of the Future" he foresaw that chemistry, both physiological and pathological, must be sought for to explain many of the phenomena of health and disease. The rôle of bacteria he had already accepted and clearly foresaw the advance in this branch. "I assume it to be a demonstrated truth," he wrote, "that the specific causes of certain of the infectious diseases are micro-organisms. If my reasoning be correct, it is simply a question of time as to the discovery of specific organisms for all the infectious diseases." The recording of the movements of the heart by the electro-cardiogram, when the instrument is at a great distance from the patient and even in another building, he would have accepted as a matter of course, for he wrote regarding the telephone and telegraph, "I will go further and say that the intrathoracic sounds may be transmitted from the patient to the physician, no matter how distant may be the one from the other."

Inasmuch as I already have quoted so liberally from his writings, I can do no better than apply to him his own estimate of Laennec:

"The career of the distinguished man, whose biography has been our theme on this occasion, is preeminently worthy of admiration. In his character were beautifully blended the finest intellectual and moral qualities of our nature. With mental powers of the highest order, were combined simplicity, modesty and purity and disinterestedness, in such measure that we feel he was a man to be loved not less than admired."

CYRANO DE BERGERAC'S OPINION OF THE MEDICAL PROFESSION.

By Charles Greene Cumston, M. D., Boston, Mass.

It is evident, from his letter entitled *Contre les Médecins*, that Cyrano de Bergerac was ill-disposed towards the medical profession. Such feeling was not new in his day, because the predecessors of the immortal Molière, during the period from 1650, *Le Médecin Volant*, to 1673, *Le Malade Imaginaire*, were dealing terrible blows at the "learned body" and, with Cyrano, endeavored to destroy the Gothic prejudices, and fought against the ancient blind and obstinate schools which were opposed to the progress of science.

The physicians cast discredit upon themselves by calling each other impostors and charlatans. Scarron, Barclay, La Fontaine, Boileau, La Bruyère continued the struggle against the profession; so did the author of *Valesiana*. "Can it be that one questions what great national and social interest there may be in having placed physicians and medicine in this pillory of satire, after having witnessed the insanity, both grostesque and criminal, of the doctrines and practice then in vogue? Can it be that one does not detect the inspiration of a sentiment of humanity and the accomplishment of a patriotic duty in this enterprise of public salubrity by ridicule?" In Cyrano's letter *Contre les Médecins* the intent is not only the act of a man who runs down a half-vanquished enemy, but a courageous attack of a libertine who makes himself the auxiliary of common sense. He was condemned and "just as criminals preach to the people from the gallows," he wished to speak to the youth of his day. *Et nunc erudimini!* He fell into the hands of *Dr. Tant Mieux*, and "from being in good health, he dies . . . Admire the effrontery of my executioner; the more I feel the disease increasing which he causes by his medicines, and the more I complain of some new symptom, the more he evinces his joy and dresses my wounds with nothing more than a '*Tant mieux*.' When I tell him that I had fallen into a lethargic syncope which lasted for an hour, he replies that it is a good sign. When he sees me in the clutches of a flux of

blood which tears me asunder: 'Good,' says he, 'that is equal to a bleeding!' When I complain of feeling like an icicle which involves all my limbs, he laughs, assuring me that he well knew that his remedies would extinguish this great fire. Sometimes even when, like Death, I cannot speak, I hear him say to those about me who are in tears on account of my serious condition: "Poor fools that you are, do you not perceive that it is the fever which is near its close?" What a fine art is medicine and how simple to practice! "What honors and riches it brings to those who cultivate it!" If the patient escapes, "the recovery is attributed to potent remedies"; and "if he dies, everyone says that he (the physician) is a clever man and had said it would occur."

Consequently, according to Cyrano we should all become physicians "so as to put under the earth those who have placed us there." A horrible and fatal profession, and to dream that one has met one of it "is capable of producing fever." "Whether it is a tertian or quartan," these clever fencers deliver us to the clergy, who chant over our cadavers. And he ends his satire by chasing away his "graduated Demon." *Vade retro, Satanas,* that is to say, remember that the reform undertaken by Bacon in the sciences, each year gains ground, that Descartes has dethroned Aristotle and that he can say of science: *Nos descendants grossiront ce dépôt qui doit s'augmenter d'âge en âge!* . . . and to those dangerous ignorants will succeed the marvelous savers of the poor human race.

I will now transcribe the letter *in extenso,* as it is little known to medical historians and, as a document, cannot be devoid of interest.

MONSIEUR,

Puisque je suis condamné (mais ce n'est que du Médecin, dont j'apellerai plus aisément que d'un arrêt prévôtal), vous voulez bien que, de même que des criminels qui prêchent le peuple quand ils sont sur l'échelle, moi qui suis entre les mains du Bourreau, je fasse aussi des remonstrances à la jeunesse. La Fièvre et la Drogueur me tiennent le poignard sur la gorge avec tant de rigueur, que j'espère d'eux qu'ils ne souffriront pas que mon discours vous puisse ennuyer. Il ne laisse pas, Monsieur le Gradué, de me dire que ce ne sera rien, et proteste cependant à tout le monde que, sans miracle, je n'en puis relever. Leurs présages, toutefois, encore que funestes, ne m'alarment guère; car je connois assez que la souplesse de leur art les oblige de condamner tous leurs malades à la mort, afin que, si quelqu'un en échappe, on attribue la guérison aux puissans remèdes qu'ils ont; et, s'il meurt, chacun s'écrie que c'est un habil homme et qu'il avoit bien dit. Mais admirez l'effronterie de mon Bourreau: plus je sens empirer le mal qu'il me cause par ses remèdes, et plus je me plains d'un nouvel accident, plus il témoigne s'en réjouir et ne me panse d'autre chose que d'un *Tant Mieux!* Quand je lui raconte que je suis tombé dans un syncope léthargique qui m'a duré près d'une heure, il répond que c'est bon signe. Quand il me voit entre les ongles d'un flux de sang qui me déchire: "Bon!" dit-il, "cela vaudra une saignée!" Quand je m'attriste de sentir comme un glaçon qui me gagne toutes les extrémités, il rit, en m'assurant qu'il le savoit bien, que ses remèdes éteindroient ce grand feu. Quelquefois même que, semblable à la Mort, je ne puis parler, je l'entends s'écrier aux miens qui pleurent de me voir à l'extrémité: "Pauvres nigauds que vous êtes, ne voyez-vous pas que c'est la fièvre qui tire aux abois?" Voila comme ce traitre me berce; et cependant, à force de me bien porter, je me meurs. Je n'ignore pas que j'ai grand tort d'avoir réclamé mes ennemis à mon secours. Mais quoi? pouvois-je deviner que ceux dont la science fait profession de guérir l'emploieroient tout entière à me tuer? car, helas! c'est ici la première fois que je suis tombé dans la fosse; et vous le devez croire, puisque si j'y avois passé quelque autre fois, je ne serois plus en état de m'en plaindre. Pour moi, je conseille aux foibles Lutteurs, afin de se venger de ceux qui les ont renversés, de se faire Médecins, car je les assure qu'ils mettront en terre ceux qui les y avoient mis. En vérité, je pense que de songer seulement, quand on dort, qu'on rencontre un Médecin, c'est capable de donner la fièvre. A voir leurs animaux étiques, affublés d'un long drap mortuaire, soutenir immobilement leur immobile maître, ne semble-t-il pas q'une bière ou la Parque c'est mise à califourchon, et ne peut-on pas prendre leur houssine pour le guidon de la Mort, puisqu'elle sert à conduire son Lieutenant? C'est pour cela sans doute que la Police leur a condamné de monter sur des mules et non pas sur des cavales, de peur que la race des gradués venant à croître, il n'y eût à la fin plus de bourreaux que de patiens. Oh! quel contentement j'aurois d'anatomiser leurs mules, ces pauvres mules qui n'ont jamais senti d'aiguillon, ni dedans, ni dessus la chaire, parce que les éperons et les bottes sont des superfluités que l'esprit délicat de la Faculté ne sauroit digérer! Ces Messieurs se gouvernent avec tant de scruple, qu'ils font même observer à ces pauvres bêtes (parce qu'elles sont leurs domestiques) des jeûnes plus rigoureux que ceux des Ninivites, et quantité de très-longs, dont le Rituel ne s'etoit point souvenu: ils leur attachent, par les diètes, la peau tout à cru dessus les os, et ne nous traitent pas mieux, nous qui les payons bien; car ces Docteurs morfondus, ces Médecins de neige, ne nous font manger que de la galée. Enfin, tous leurs discours sont si froids, que je ne trouve qu'une différence entre eux et les peuples du Nord, c'est que les Norwégiens ont toujours les mules. Ils sont tellement ennemis de la chaleur, qu'ils n'ont pas sitôt connu dans un malade quelque chose de tiède, que, comme si ce corps étoit un Mont-Gibel,* les voila tous occupés à saigner, à clistériser, à noyer ce pauvre estomac dans le séné, la casse, la tisane, et à débiliter la vie pour débiliter, disent-ils, ce feu qui prend nourriture, tant qu'il rencontre de la matière; de sorte que, si la main tout expresse de Dieu les fait rejamber vers le monde, ils l'attribuent aussitôt à la vertue de réfrigératifs dont ils ont assoupi cet incendie. Ils nous dérobent la chaleur et l'énergie de l'être qui est au sang: ainsi, pour avoir été trop saignés, nos Ames, en s'envolant, servent de volant aux palettes de leurs chirurgiens. Eh bien, Monsieur, que vous en semble? Après cela, n'avons-nous pas grand tort de nous plaindre de ce qu'ils demandent dix pistoles pour une maladie de huit jours? N'est-ce-pas une cure à bon marché où il n'y a point de charge d'âmes? Mais confrontez un peu, je vous prie, la ressemblance qu'il y a entre le procédé des Drogueurs et le procédé d'un Criminel. Le Médecin, ayant considéré les urines, interoge le patient sur la selle, le condamne; le Chirurgien le bande et l'Apothicaire décharge son coup par derrière. Les affligés même, qui pensent avoir besoin de leur chicane, n'en font pas grande estime. A peine sont-ils entrés dans la chambre, qu'on tire la langue au Médecin, on tourne le cul à l'Apothicaire et l'on tend le poing au Barbier. Il est vrai qu'ils s'en vengent de bonne sorte: il en coûte toujours au Railleur le cimetière. J'ai remarqué que tout ce qu'il y a de funeste aux Enfers est compris au nombre de trois: on y voit trois fleuves, trois chiens, trois juges, trois Parques, trois Gerions, trois Hécates, trois Gorgones, trois Furies. Les fléaux dont Dieu se sert à punir les hommes sont divisés aussi par trois: la peste, la guerre et la faim; le monde, la chair et le diable; la foudre, le tonnerre et l'éclair; la saignée, la médecine et le lavement. Enfin, trois sortes de gens sont envoyés au monde tout exprès pour martyriser

* Popular name for Etna.

l'homme pendant la vie: l'Avocat tourmente la bourse, le Médecin le corps, et le Théologien l'âme. Encore ils s'en vantent, nos Ecuyers à mules! car, comme un jour le mien entroit dans ma chambre, sans autre explication, je ne lui fis que dire: *Combien?* L'impudent meurtrier, qui comprit aussitôt que je lui demandois le nombre de ses homicides, empoignant sa grosse barbe, me répondit: "*Autant!* Je n'en fais point, continua-t-il, la petite bouche, et, pour vous montrer que nous apprenons aussi bien que nous nous exerçons, de même qu'eux, toute nôtre vie, sur la tierce et sur la quarte." La reflexion que je fis sur l'innocence effrontée de ce personnage fut que si les autres disoient moins, ils en font bien autant; que celui-là se contentoit de tuer, et que ses comerades joignoient au meutre la trahison; que, qui voudroit écrire les voyages d'un Médecin, on ne pourroit pas les compter par les épitaphes de sa Paroisse, et qu'enfin, si la fièvre nous attaque, le Médecin nous tue et le Prétre en chante. Mais ce seroit peu à Madame la Faculté d'envoyer nos corps au sépulcre, si elle n'attentoit sur notre âme. Le Chirurgien enrageroit, plutôt qu'avec sa charpie tous les blessés qui font naufrage entre ses mains ne fussent trouvés morts couchés avec leurs tentes.* Concluons donc, Monsieur, que tantôt ils envoient et la Mort et sa faux ensevelies dans un grain de mandragore, tantôt liquifiée dans le canon d'une seringue, tantôt sur la pointe d'une lancette; que, tantôt, avec un juillet, ils nous font mourir en octobre, et qu'enfin ils sont accoutumés d'envelopper leurs venins dans de si beaux termes, que dernièrement je pensois que le mien m'eût obtenu du Roi une Abbaye commendataire, quand il m'assura qu'il m'alloit donner un Bénéfice de ventre. Oh! qu'alors j'eusse été réjoui si j'eusse pu trouver à le battre par équivoque, comme fit une Villageoise à qui un de ces Bateleurs demandant si elle avoit du pouls, elle lui répondit avec force soufflets et force égratignures, qu'il étoit un sot, et qu'en toute sa vie elle n'avoit jamais eu ni poux ni puces! Mais leurs crimes sont trop grands pour ne les punir qu'avec des équivoques; citons-les en justice de la part des Trépassés. Entre tous les humains, ils ne trouveront pas un Avocat; il n'y aura Juge qui n'en convainque quelqu'un d'avoir tué son père; et, parmi toutes les pratiques qu'ils ont couchées au cimetière, il n'y aura pas une tête qui ne leur grince les dents. Que les pussent-elles dévorer! Il ne faudriat pas craindre que les larmes qu'on jetteroit de leur perte fissent grossir les rivières: on ne pleure, aux trépas de ces gens-là, que de ce qu'ils ont trop vécu. Ils sont tellement aimés, qu'on trouve bon tout ce qui vient d'eux, même jusqu'à leur mort; comme s'ils etoient d'autres Messies, ils meurent aussi bien que Dieu pour le salut des hommes. Mais, bons Dieux! n'est-ce pas encore là mon mauvais Ange qui s'approche? Oh! c'est lui-même! je le connois à sa soutane. *Vade retro, Satanas!* Champagne, apportez-moi le bénitier. Démon gradué, je te renonce! Oh! l'effronté Satan! Ne me viens-tu pas encore donner quelque aposume? Misericorde! C'est un Diable huguenot, il ne se soucie point de l'eau bénite! Encore, si j'avois des poigns assez roides pour former un casse-museau; mais, hélas! ce qu'il m'a fait avaler c'est si bien tourné en ma substance, qu'à force d'user de consommés, je suis tout consommé moi-même. Venez donc vitement à mon secours, ou vous allez perdre,

Monsieur,

Votre plus fidèle Serviteur

D. C. D. B.

TRANSLATION.

[Sir,

Since I am condemned (but only so by the physician, from whom I can appeal more easily than from a prevotal judgment) you wish me, being in the hands of my executioner, to address the youth as criminals do the people when on the scaffold. Fever and the Drugger hold a dagger over my throat with such rigor, that I hope they will not permit my discourse to weary you. Monsieur the Graduate does not cease to tell me that it is nothing and never the less, protests to everyone, that unless some miracle occurs, I may never get up. However, their foreboding, although sombre, hardly alarmes me, for I know well that the cunning of their art forces them to condemn all their patients to death, so that should some escape, the cure will be attributed to the powerful remedies employed, and, if one dies, everyone says what a clever man he (the physician) was and how truly he had spoken. But please admire the impudence of my executioner; the more my affection increases by the use of his remedies, and the more I complain of some new symptom, the more he manifests his pleasure and only dresses my wounds with a "*So much the better!*" When I tell him that that I have had a lethargic syncope which lasted nearly an hour, he replies that it is a good sign. When he sees me in the clutches of a flux of blood which tears me to pieces: "Good, says he, that is equal to a bleeding." When I sadly tell him that I feel like an icicle which involves my limbs, he laughs, assuring me that he well knew it, that his remedies will extinguish this great fire. Sometimes even, when like Death, I cannot speak, I hear him tell those about me who weep for my serious condition: "Poor fools that you are, do you not see that it is the end of the fever?" Thus does this traitor treat me; and, never the less, in spite of being well, I kill myself. I am fully aware that I am wrong in having called my enemies to my aid. But now! could I have suspected that those who's science professes to cure, would employ it for killing me? because, alas! this is the first time that I have fallen into the ditch, and so you must think, because had I been there before, I should now be in no condition to complain. I advise all feeble strugglers, in order to avenge themselves upon those who have overturned them, to become physicians, because I can assure them that they can put under ground those that have put them there. In truth, I think that to even dream that one has met a physician, is quite enough to give one a fever. To see their lank animals, covered with a long mortuary cloths, motionlessly supporting their motionless master, would it not seem that a coffin or the Parcæ had straddled them, and not to mistake their switch for the guide to Death, since it serves to conduct its Lieutenant? It is for this reason, undoubtedly, that the Police have ordered them to ride on mules and not on horses, for fear that the race of graduates by increasing, there would at length be more executioners than patients. Oh! how happy would I be to dissect their mules, these poor mules who have never felt the spur, neither within nor over their flesh, because spurs and boots are superfluities that the delicate mind of the Faculty could never digest! These Gentlemen govern themselves with so great a scruple, that they even oblige these poor beasts (because they are their servants) to resort to fasts more rigorous than those of the Ninivites, which the Ritual had quite forgotten; by diet, they attach their skin to their bones, and do not treat us, who pay them well, any better; because these Doctors who strike a chill into one, these Physicians of snow, only allow us to eat frost. Then again, their discourse is so cold, that I find only one difference between them and the Northern people, and that is that the Norwegians always have chill-blains on the heels while they always have their heels on the mules. They are such enemies of heat, that just as soon as they have discovered something tepid in a patient, that, as if this body was an Etna, there they are bleeding, giving enemata, drowning this poor stomach in senna, cassia, diet drinks, and debilitating life in order to debilitate, say they, this fire which takes nourishment wherever there is matter (that is, food for it); so that, if the hand of God expressly makes them return to earth they at once attribute it to the virtue of their refrigerating drugs by which they have extinguished the conflagration. From us they remove the heat and

* A pun: *tente*, which is pronounced *tante*, is the name given to lint (charpie) used by surgeons in dressing wounds. It was inserted into the wound.

energy of the being which is in the blood and thus, for having been bled too much, our souls flit off, serving as shuttle-cocks to the pallets of their surgeons. Well, Sir, what do you think? After this, are we not very wrong to complain when they ask ten pistols for a disease which lasts eight days? Is not this a cheap cure where there is no charge of souls? But compare a little, I beg of you, the resemblance there is between the procedures of the Druggers and those of a Criminal. The Physician, having considered the urine, questions the patient as to his stools and condemns him; the Surgeon bandages him and the Apothecary discharges his shot in the back sides. Even the afflicted, who think they have need of their cavilling, hold them in small estimation. Hardly have they entered the room, than one sticks his tongue out at the Physician, the back sides are turned to the Apothecary and the fist is offered to the Barber. It is true that they thoroughly avenge themselves; the cemetary is the price paid by the Jester. I have noted that all that is fatal in Hell is comprised in the number three; there are there three rivers, three dogs, three judges, three Fates, three Gerions, three Hecates, three Gorgons, three Furies. The plagues which God employs to punish man are also divided by threes: The plague, war and hunger; the earth, the flesh and the devil; the thunderbolt, thunder and lightening; bleeing, purgatives and enemata. Lastly, three kinds of people are put upon earth expressly for martyrizing man during his life: The lawyer torments the pocket-book, the Physician the body and the Theologian the soul. And they brag about it, our mule-mounted Squires! because, one day when mine entered the room, without other explanation, I only said: "*How many?*" The impudent murderer, who understood at once that I asked him the number of his homicides, stroking his big beard, replied: "*So much!* I commit none," continued he, playing the difficult, "and to show you that we learn quite as well as Fencers, the art of killing, we like them, exercise our entire life on tertian and quartan fever." The reflexion that I made on the impudent innocence of this person was that if others said less they did quite as much; that this one contented himself with killing and that his comrades joined treason with murder; that he who would write the travels of a Physician could not count them by the number of epitaphs in his Parish, and that, lastly, if fever attacks us the Physician kills us and the Priest sings of it. But it would be little for Madame la Faculté to send our bodies to burial if she did not involve our souls. The Surgeon would be angry, rather than with his lint, all the wounded who are wrecked by his hands were not found dead and lying with their tents. Let us conclude, Sir, that, at times they send both Death and his scythe burried in a grain of mandrake, at others liquified in the barrel of a syringe, and still again at the point of the lancet; that sometimes with a July, they make us die in October, and that they are accustomed to surround their poisons in such fine terms that, laterly, I thought that my physician would have obtained for me a commendatory Abbey from the King, when he assured me that he was about to give me a privilege of the belly. Oh! then would I have rejoiced could I have but found the means to combat him by equivocation, as did the peasant woman to whom one of these jugglers asked if she had a pulse, when she replied by numerous blows and scratches that he was a fool and that in all her life she had never had either lice or flees! * But their crimes are too great to be punished only by equivocation; let us bring them to justice on behalf of the Dead. Among all the living they will not find a single Lawyer; there is not a Judge who will not convict some one of them of having killed his father; and among all the clients that they have placed in the grave yard, there is not a single skull which does not grind his teeth. Could they but devour them! It is not to be feared that the tears shed for them at their death would make large rivers: one only cries at their death because they lived too long. They are so beloved, that everything done by them, even their death, is good; as if they were other Messiahs, they die just as God did, for the salvation of men. But, great Gods! is not my bad Angel approaching again? Oh! t'is he himself! I know him by his cassock. *Vade retro, Satanus!* Champagne, bring me the holy-water basin. Graduate Demon, I renounce thee! Oh! impudent Satan! Comest thee again to give me another medicinal decoction? Misericorde! it is a huguenot Devil who cares nothing for holy water! Again, if I only had fists sufficiently strong for a break-snout; but, alas! what he made me swallow has so well turned within my substance, that from using consommés I am myself completely consumed. Come then, quickly to my rescue or you will lose

Sir,

Your most faithful Servant

D. C. D. B.]

* By comparing the French, one will see the play on the prononciation of *pouls* and *poux*.

Comment is quite unnecessary. Cyrano has set forth in the above lines the consensus of public opinion regarding the faculty of medicine of Paris. As an illustration of the narrow-mindedness of its members, it is enough to say that Harvey's discovery of the circulation was not admitted by that body until some twenty years later. The ancient authors were alone considered, and not until the caustic satire of Molière had wrought its good work, did the teachings of Hippocrates and Galen disappear and the great truths fast coming to light were accepted.

NOTES AND NEWS.

ARMY MEDICAL CORPS EXAMINATIONS.

The Surgeon General of the army announces that preliminary examinations for the appointment of first lieutenants in the army medical corps will be held on July 15, 1912, and September 3, 1912, at points to be hereafter designated.

Full information concerning these examinations can be procured upon application to the "Surgeon General, U. S. Army, Washington, D. C." The essential requirements to securing an appointment are that the applicant shall be a citizen of the United States, shall be between 22 and 30 years of age, a graduate of a medical school legally authorized to confer the degree of doctor of medicine, shall be of good moral character and habits, and shall have had at least one year's hospital training, after graduation. The examinations will be held concurrently throughout the country at points where boards can be convened. Due consideration will be given to localities from which applications are received, in order to lessen the traveling expenses of applicants as much as possible.

The examination in subjects of general education (mathematics, geography, history, general literature, and Latin) may be omitted in the case of applicants holding diplomas from reputable literary or scientific colleges, normal schools or high schools, or graduates of medical schools which require an entrance examination satisfactory to the faculty of the Army Medical School.

In order to perfect all necessary arrangements for the examination, applications must be complete and in possession of the Adjutant General at least three weeks before the date of examination. Early attention is therefore enjoined upon all intending applicants. There are at present sixty-eight vacancies in the medical corps of the army.

NOTES ON NEW BOOKS.

The Treatment of Fractures by Mobilisation and Massage. By JAMES B. MENNELL, M. D. With an introduction by DR. J. LUCAS-CHAMPIONNIÈRE. $4.00. (*London: Macmillan & Co., Limited, St. Martin's Street, 1911.*)

The methods of treatment advanced in this book are founded very largely on those of Professor Lucas-Championnière of Paris. The author says that the pathology of the results obtained in the treatment of fractures by "massage and mobilisation" has not yet been completely worked out, so especial attention will be given to the practical results.

Careful notes on over 400 cases thus treated form the basis of the work. The book is divided into two parts. In Part I, the general subject of fractures is considered and the methods of procedure under this form of treatment. In Part II, the detail of the treatment of individual fractures is taken up.

The author treats all fractures by a painless, gentle massage, which is called "glucokinesis," "The movements of which are little more than a caress, being so smooth and light that they almost resemble a mesmeric pass." "Whatever the movement may be it is to be performed slowly, not more than ten or twelve times to the minute. It must be repeated with inexorable regularity, both as regards direction and rapidity. The direction should coincide with that of the venous flow or of the underlying muscular fibers." "The one criterion of the massage is that it should be painless. Moreover, if pain be present, the massage must relieve it; otherwise the technic is at fault."

About fifteen minutes each day is devoted to the massage. In addition to the massage, "mobilisation" by active and passive motions is necessary. "Four rules govern this portion of the treatment. The movements must be painless; amplitude of movement must be sacrificed to frequency; all movements possible of each point of the injured limb must be performed; and no joint in the injured limb must be neglected." Splints are used for a short time as an adjunct to the above treatment. "The use of splints for four days will prove sufficient for the majority of fractures, a week for the remainder, except possibly for fractures of the femur, where there has been great displacement with consequent tearing of the periosteum."

I will mention one case reported by the author to illustrate the above treatment: A patient with a "back fire" fracture through the lowest inch of the radius came in after a sleepless night suffering great pain. The radiograph showed a fracture into the joint, with great comminution and considerable spreading of the fragments. The forearm was much swollen as was the lower portion of the arm; there was much bruising and every joint below the elbow was perfectly rigid. After fifteen minutes massage all pain had disappeared and the patient could move the fingers and thumb almost freely; slight painless movements were performed at the wrist, and the elbow movements were completely restored. From this time there was no further pain. The splints were abandoned in five days and at the end of a week the patient was performing various exercises and using his hand for feeding, etc. In less than six weeks he was on full duty.

There are four possible contraindications to this method noted by the author. Excessive mobility of the fragments, skin lesions, extreme youth of the patient, and extreme old age. However, he says that none of these are absolute contraindications.

From the above very brief outline an idea of the method can be obtained. There are a number of valuable points brought out on the general subject of fractures, but it is difficult to accept some of the author's ideas.

There is no doubt but that most of us are disposed to keep a broken bone at rest in a fixation apparatus of one sort or another, for a longer time than is absolutely necessary, but the removal of such support as early as the author advises seems to one who has had no experience in treating fractures entirely by "mobilisation and massage" to be somewhat radical. The use of "massage and mobilisation" has undoubtedly been much neglected in the treatment of fractures, and if the book accomplishes nothing more than to again bring this important adjunct of early functional results to the attention of the medical profession, it will have done a good work. The painless treatment and rapid results obtained by the author show what can be done by an expert in this method of treatment, but in the hands of the ordinary physician, it would seem that the patient would have a better chance if a fixation apparatus were used over a longer period of time than is advised in this treatise.

The book is nicely gotten up and is well printed, but the lack of an index is a disadvantage.

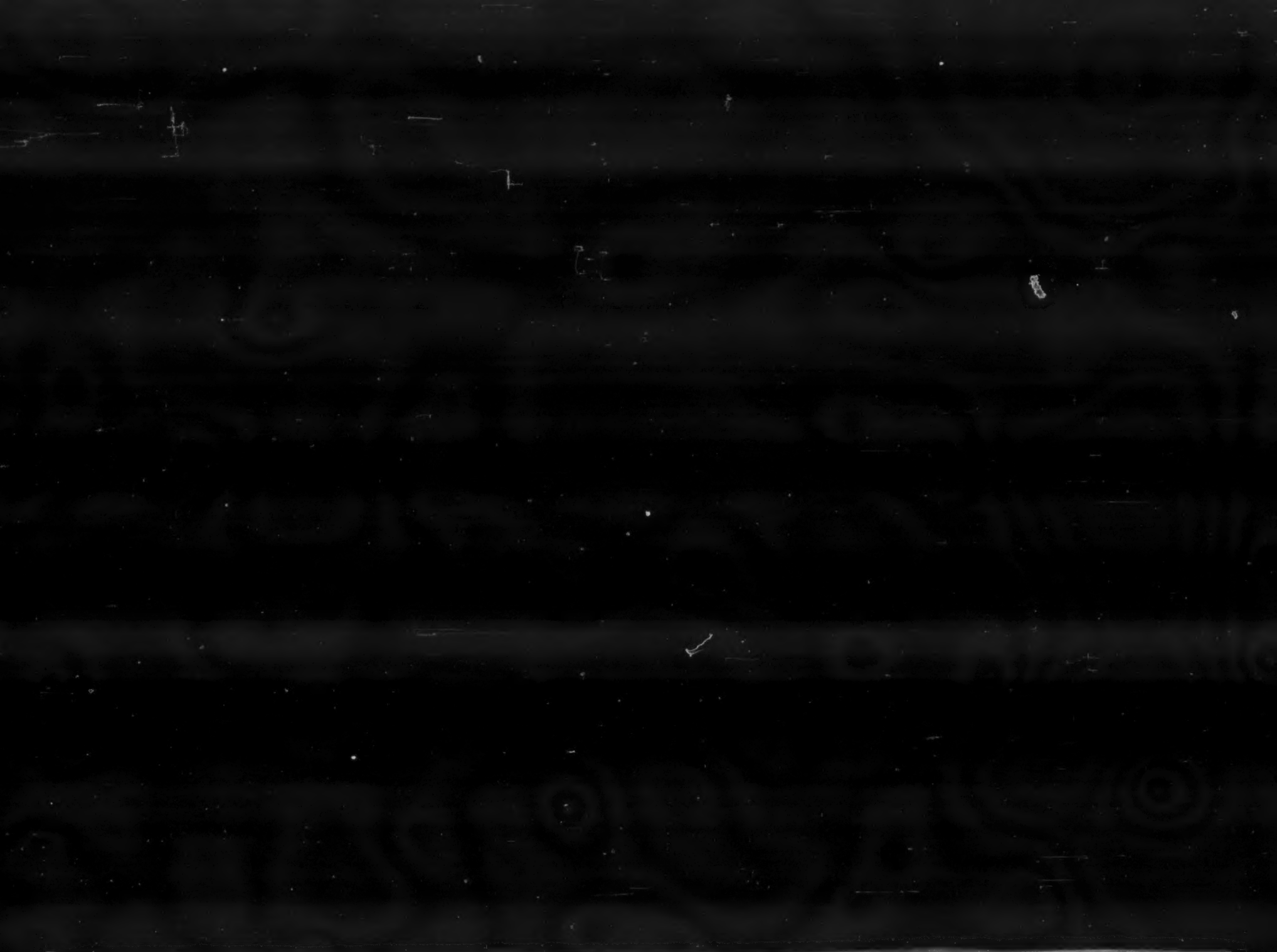
The treatment of fractures undoubtedly needs a great deal of improvement, and this book will be of considerable interest to anyone who is endeavoring to develop better methods. Possibly a satisfactory compromise between the generally accepted method and that advocated by the author might solve the problem.

J. S. D.

On Bronchial Asthma. Its Pathology and Treatment. By J. B. BERKART, M. D., etc. Revised and Abridged Third Edition. (*London, New York, etc.: Oxford University Press.*)

The author presents, in this brief monograph, the view on the causation of asthma that it is not of so-called nervous origin, but due to an obstruction of the finer and larger bronchials by a serofibrinous exudation, probably induced by some microorganism. He believes that patients who suffer from asthma have generally a much impaired general nutrition and never have perfectly normal chests, but that these have been affected by rickets in childhood and that as a result, the lungs are usually smaller than the average, though rarely they may be larger. The heart is also affected by these alterations in shape of the chest. The evidence brought forward by Dr. Berkart to support his reasoning does not seem sufficient to explain all cases of asthma, and rather than simplifying the pathology of the disease, makes it more complex in some particulars. It is an interesting theory clearly presented which needs more proof before it can be accepted as the final cause of this obscure disease.

New and Non-official Remedies, 1912. Containing Descriptions of the Articles which have been Accepted by the Council on Pharmacy and Chemistry of the American Medical Association Prior to January 1, 1912. 50 cts. (*Chicago: American Medical Association, 1912.*)

Much praise is due the Council on Pharmacy and Chemistry of the American Medical Association for their careful work in preparing this volume which is serviceable to all physicians as well as pharmacists. The title is self-explanatory. The book is neatly and cheaply printed and in compact form contains the information published weekly by the Council in the Journal of the society. With the abundance of remedies at command it is an outrage that so many physicians should prescribe useless and harmful proprietary drugs, and it is to be hoped that the educational work of this Council and of the association at large will reap greater returns in the future than it has in the past.

The Johns Hopkins Hospital Bulletins are issued monthly. They are printed by the LORD BALTIMORE PRESS, Baltimore. Subscriptions, $2.00 a year (foreign postage, 50 cents), may be addressed to the publishers, THE JOHNS HOPKINS PRESS, BALTIMORE; single copies will be sent by mail for twenty-five cents each. Single copies may also be procured from the BALTIMORE NEWS CO., Baltimore.